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Issue 17 • Mar 4 1989

Double your PCW memory - page 42

NEW COMPUTER EXPRESS

First news, first reviews – every week

NEVER ENDING STORY

How the Spectrum started home computing - page 25

Picture this

Express guide to art made easy: the best in digitisers – page 15

SHOW OF STRENGTH - page 2

Big guns bring out new PC's at Which Computer? Show

MIND YOUR LANGUAGE!

Worlds beyond BASIC – page 21

Sections for YOUR machine

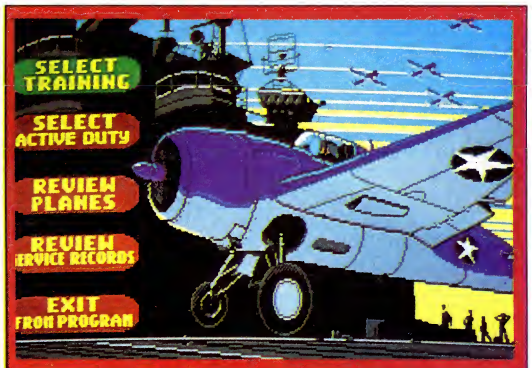
- Atari ST
- PC
- Amiga
- Spectrum
- C64
- CPC
- PCW
- QL
- BBC
- MSX

– pages 33–40

Small Wonder?

Atari's new pocket PC

page 28

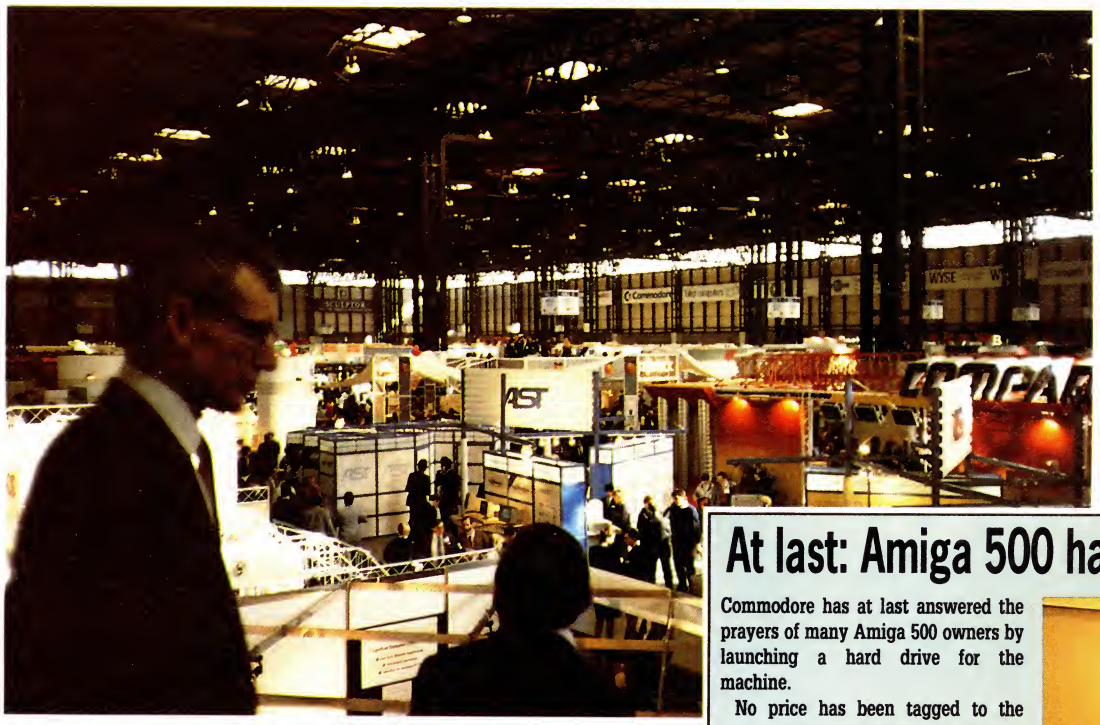


Flight of Fancy

PC Battlehawks takes off - page 49

Comment 4 • Charts 5 • New Games 8 • Letters 11 • Jobs 18 • Columns 33 • Beginners 42 • Tips 45 • Entertainment 48 • Vouchers 51 • PSsst! 54

PITCHERS AT AN



• Which? '89: Bigger the ever. Attendances are up again

The National Exhibition Centre in Birmingham last week became the focus for all the latest in high tech business computing as the industry's leading lights descended on *Which? '89* - Britain's biggest serious computer show.

Over 500 exhibitors set up shop in the enormous hall and the suit clad business fraternity duly obliged by turning up in their thousands. Computing's most notorious publicity seekers were sent diving for coverage by national press and television cameras inquisitively threaded their way through the masses.

New products weren't so much in evidence as in years gone by. There were an awful lot of 386's to be seen as the entire industry shifted upmarket by yet another notch. The low cost PC sector was represented in force by established machines – only a few hardware manufacturers ventured to launch new PCs at less than £1,000.

Atari gratefully stepped into the limelight as being the company with the most interesting new product — its Folio Pocket PC.

Amstrad once again showed up with that old stand which it takes everywhere. No new hardware, but the punters still filled the floor space. Brentwood's best loved Beastie Boy Alan Sugar was glimpsed being whisked through the crowds into the Amstrad inner sanctum.

And Commodore concentrated on its new PC bundle with monitor (*Express* 14) as well as launching its first hard disk for the Amiga (see separate story).

Leader of the Democrats Paddy Ashdown was to open the show but due to the Pontypridd by-election he cancelled. The organisers apparently chose to keep this fact under their hats until the very last moment. Whatever, few seemed to notice the right honourable gentleman's absence.

The punters were as willing as always to put up with the overheated hall and endless queuing for bland food and tepid lager for a comprehensive look at what's on offer in serious and professional computing. First day attendance was were up 12 per cent.

Anyone searching for the best business solution will not have been disappointed with the thousands of printers, portables and PCs on offer as well as the generally professional presentations of the best in business software.

ACORN: The much touted UNIX workstation made its debut at the show with a fistful of sometimes baffling applications and software. Most punters will not have a hope of getting their hands on the R140 (£3,500 being a tad dear) but Acorn sees the machine showing up in education, commerce and research. Just for the record the machine sports 4Mb of RAM and an internal 60Mb of unformatted hard disk. The stand was jam-packed with Archimedes' showing the RISC OS and a new DTP system.

• MicroPro: Creaming it

• Acorn's stand bristled with enthusiasts

• Opus Mini PC: One of the few low cost launches

At last: Amiga 500 hard drive unveiled

Commodore has at last answered the prayers of many Amiga 500 owners by launching a hard drive for the machine.

No price has been tagged to the gadget as yet although it is heavily rumoured to be in the region of £500. The A590 Hard Disk which features a 20Mb built in hard drive and 2Mb of RAM will not be available for some weeks.

Commodore feels that whilst the machine was originally launched as a graphics station it has now proved itself in a multitude of applications. Gamesters looking to upgrade into serious computing are being pitched.

• A590 at Which?: A500 upgrade

EXHIBITION

AKHTER: One of the few firms to venture down market into the low cost area was Akhter. Nestled near the back of the main hall was the new £499 Mini PC. Weighing in at just 4Kg the tiny thing is being aimed at first time users and those looking at space conservation.

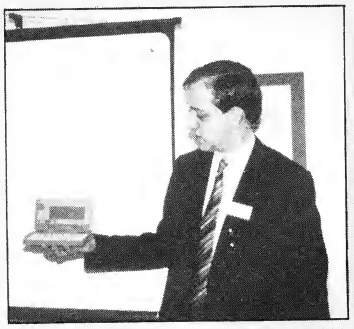
AMSTRAD: Reporters searching for something to say will have been disappointed with Amstrad. Apart from the OS/2 venture and lines of 1512s, 1640s, PPCs and PCWs the best reason for a visit was another look at the 286s and 386s launched last September.

ATARI: While the much hyped Pocket PC was being grandly brandished around Atari failed to show up with the widely expected Mega 1 ST. The machine is to be bundled with word processing software come Easter time (*Express* 12). Atari is still getting the thing together. Much interest was generated by the incredible Transputer Workstation which spent the show buzzing away to fascinated crowds.

CHRISTIE: PrintDisk was launched for the time sensitive PC user. It will read or print any files from a disk saving the user from tying up the machine for printing. Also, the firm says, it is useful for those who share printers. price is likely to be in the region of £500.

Pocket PCs: The battle begins

As expected Atari launched its Folio Pocket PC at the *Which Computer?* Show heralding in a battle to win the hearts and cash of a potentially huge user base.



• DIP's boss David Frodsham unveils the Folio Pocket PC

Whilst Atari is the first to come up with such a machine another company in the US is secretly planning to launch its own handheld MS/DOS computer. The competition is likely to come from Atari's own backyard in Sunnyvale, California where Poquet Corporation is developing its own pocket sized PC.

Poquet has only been in existence for 12 months now, the launch of its PC is expected later this year. The firm this week opened up offices in the UK. No details are known about its machine although it is understood that prototypes have been developed.

Ironically, both Poquet and the Pocket PCs developer DIP were engaged in talks last year to merge their technological expertise and produce the definitive handheld PC. However, both decided to pursue their own goals with DIP signing up with the giant Atari.

The Atari Folio will be generally available by the middle of summer at £200. Atari hopes that 100,000 British consumers will own the machine within its first year of availability.

COMMODORE: As predicted in *Express* last November the "monster" Amiga 2500 with AT bridgeboard was to be seen for the first time along with its A2000 cousins. The 2500 UX Unix machine was also "previewed". This is a UNIX machine but it also runs AmigaDOS on the hard drive. That £599 PC10 with printer bundle was launched officially.

EPSON: Apart from the formidable 48 pin printer Epson was showing off its new 286 machine. The AX Portable costs £2,749 and runs at 12 MHz with an NTN screen.

MICROPRO: Its efforts were concentrated on celebrating the tenth anniversary of its word processing package *WordStar*. The stand itself was decked out like a great cream cake with champers being offered to those in bubbly spirits. The new version of the package, release 5, was being demonstrated.

MIRRORSOFT: Its *Personal Assistant* finally passed the beta testing and was given a first airing. The £199 PC program is an automated information and messaging system which allows users to send the likes of telexes, faxes and electronic mail messages. It also allows the use of two online databases *Infocheck* (for financial info) and *Profile* (which used to be called *World Reporter*).

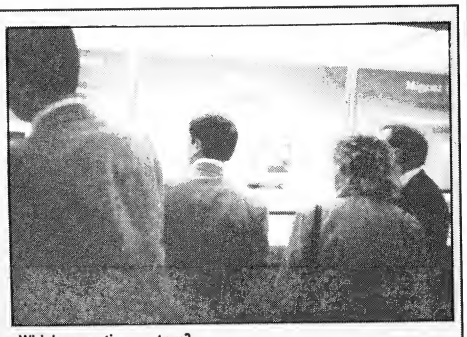
SAMSUNG: *Which? '89* was the venue for Samsung's first foray into the UK printer arena with a 24 pin dot matrix model. This should be available later this month at £350.

PSION: In the field of handheld computers Psion, for once, had to take a back street as Atari got on with its launch. There was another model for the range to be seen though – the 96K RAM P350. This is designed for specialist applications and the user's own special software. No announcements were made on the 'longer lasting laptop' which should be launched later this year (*Express* 10).

ZENITH: A rather sheepish Superman lookalike was on hand as Zenith unveiled its new 386 desktop PC, the Z-386/25. Featuring 2Mb it costs £3,795.

Sugar backs new OS

Amstrad has tied up a licensing deal with Microsoft for the use of its OS/2 operating system which will be available for its 286 and 386 machines.



• Which operating system?

In effect this means that buyers will be able to run their machines with standard PC software as well as OS/2 compatible programs. IBM has backed OS/2 as the standard operating system of the future. The firm's boss Alan Sugar has dabbled somewhat in future technology over the past year.

Last September he secured the rights to use MCA technology as, when and if he ever feels like it via a reciprocal deal with IBM. He has also sung his approval for EISA – the 'alternative' standard hardware of tomorrow.

The version of OS/2 which will come with the PC2286 and PC2386 will include *Presentation Manager* which, amongst other things, allows multi tasking. Meantime, Amstrad has moved some of its production from the Far East into the Scotland via a deal with GEC.

CONTENTS

FEATURES

DIGITISERS 15
Put yourself in the picture with a digitiser: the *Express* buyer's guide
PROGRAMMING LANGUAGES 21
Technobabel explained: your tongue-in-cheek guide to computer tongues
HISTORY OF THE SPECTRUM 25
The machine that started the home computer market

REGULARS

EXPRESS COMMENT 4
CHARTS 5
NEW GAMES 8
LETTERS 11
JOBS 18
BEGINNERS 42
Graphics: the first-timer's guide to drawing tools
TECH TIPS 45
GAMES 48-49
Battlehawks, Space Harrier, Xenon, DNA Warrior, Titan
GAME PREVIEWS 50
Silkworm, Raider, Prison, Stormlord, Airborne Ranger, Alien Legion
VOUCHERS 51
PSsst... 54

YOUR MACHINE

ST 33
PC 34
Amiga 35
Spectrum 36
Commodore 64 37
PCW, QL 38
BBC, MSX 39
CPC 40

NEW COMPUTER EXPRESS

COMMENT

The market in their pocket?

It is very tempting to compare the Atari Pocket PC to the Sony Walkman. Both are a miniaturisation of technology, mobilising a product which in its standard immovable form is approaching market saturation. Atari is confidently expecting to shift hundreds of thousands of them by the end of the year. Will the Pocket PC become part of every briefcase, bag and rucksack along with the portable phone, the travel iron and the personal stereo?

Portable phone, yes. Travel iron, possibly. Walkman, no.

For 90's business people it will be the piece of equipment to have and to be seen to have on the 125. It's the right spec, the right price, the right size, and just the right image. Though Atari want it to be seen as a serious machine, definitely not an executive toy, it'll still become associated with a particular type.

The impact on the itinerant non-business user – the journalist, travelling writer, archaeology student or whatever – is less certain. If you're looking for a mobile keyboard as an extension to your word processing system at home, satisfactory alternatives already exist – and the normal-size keyboards of the Z88 or Tandy portables are rather easier for continuous typing than the Pocket PC, and just as easy to fit into an overnight bag.

But the really big market, the leisure and home user, won't be in the least affected by the new baby. Listening to a personal stereo is a passive activity; using a computer is active, and only approaches passivity in game playing, something the pocket PC is not designed to do. Few of us could spend a four-hour train journey developing a BASIC listing. The portable leisure computer – a hand-held Amiga – is many years away.

The Pocket PC will succeed nicely as a business person's tool. It will be seen as a symbol of success, up-market skill and business dash, and may even make its way into folklore, being identified as much with a type as a Filofax; but the face of home and leisure computing isn't going to change. Not just yet.

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Level 9 scoops adventure prize

Level 9's *Ingrid's Back* has scooped what is claimed to be British adventuring's most prestigious award.

The game was voted Best Adventure of 1988 at the Adventure Club's annual awards ceremony in London's Baker Street. The "chalices" are presented to the best in adventure games and are voted on by 700 hardened adventure players.

The choice of *Ingrid's Back* has surprised some observers – when it was launched last autumn it received only lukewarm reviews. Level 9, though, is clearly highly regarded amongst adventurers. The Austin family, which makes up the company, was also given the honouree award for services to adventuring (etc). Its *Lancelot* was also commended along with *Beyond Zork* (Infocom/Activision).

Legend of the Sword (Silicon/Rainbird) took the bronze chalice, whilst the silver went to Magnetic Scrolls/Rainbird for *Jinxter*.

Doctor Jekyll and Mr Hyde (*The Essential Myth*) won the award for best mail order only adventure.

"These are the only awards which are truly representative of adventuring," a spokesman claimed. "The awards are only voted by adventure players. Often, arcade-type magazines run adventure awards, but arcade players just vote for the ones which they saw in adverts."

• Level 9: Backing a winner

EPYX/ INFO MERGER OFF

The great merger between games software giants Epyx and Infogrames appears to have been put on hold.

Last autumn both companies announced that they would be joining forces to create a formidable world power in games publishing. At the time some were surprised at the term 'merger', believing that the American firm, Epyx, was a good deal bigger than French publisher Infogrames. Some had even termed it a "takeover".

The merging of two companies is an intricate and difficult process – both firms are citing this as the main reason for the change of heart. Insiders have also suggested that since the merger announcement Infogrames' position has become stronger (mainly via hits like *Hostages* and *Purple Saturn Day*) whilst Epyx has not enjoyed as much success as usual. The firm is also believed to be ploughing resources into the rumoured hand-held computer due to be launched in the early summer.

For now, the collaboration between both firms is being restricted to technical development on a new strain of games due to be announced in the near future.

"It is true that things have not gone as well as planned," Infogrames' managing director Thomas Schneider told *Express*. "It is difficult to do this so fast. Things have not been so stable as we expected."

Epyx boss Gill Freeman said: "It's not a question of how well things have gone, it's a question of how we want to do things. We've decided that it would be easier to work in this way. It's the legal form of the agreement which has changed."

It is possible that the two firms will come together in the distant future if their joint ventures come off. Schneider said that emerging technologies such as CDI would require large worldwide companies capable of handling a new, expensive, and high tech market.

IBM's cut and thrust

IBM is offering its dealers cheap Model 30 PCs in an effort to bring prices closer to those of rivals such as Amstrad.

It is up to individual dealers whether they offer the discounts on to consumers, although bargains are a likelihood for the smart shopper – the retailers are reportedly being offered astonishing discounts of up to 57 per cent for bulk purchases. IBM's machines are traditionally a good deal more expensive than those of Amstrad's. The new prices could bring machines to within 15 per cent of Amstrad prices.

Radiation fears prompt 'safety' computing

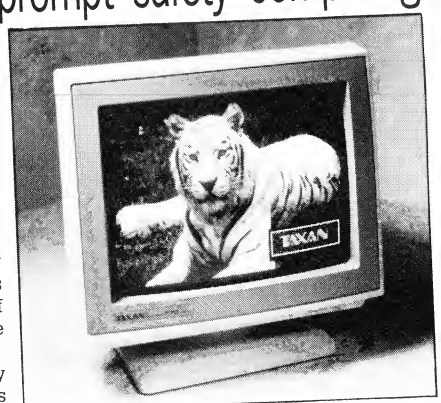
As concern grows over radiation levels emitted from monitors, Taxan has launched a new range of 'safe' models.

The firm says this is in response to growing concern in continental countries such as Sweden that the use of monitors can be unhealthy. For example, recent reports suggest that use of monitors can cause miscarriages.

Sweden is some way ahead of the UK on this matter, having published official reports on health and safety amongst those who work with VDUs. Taxan, despite the launch, is stressing that talk of harmful monitors has not been proven.

"There is no proof that conventional monitors are harmful, but where the technology to reduce emission levels is available users may well prefer to take advantage of it," said Taxan's Hugh Chappell.

The two low-radiation monitors cost £50 more than their normal counterparts. The Supervision 770 weighs in at £699 whilst the 780LR costs £629.



• Multivision 770LR: Better for pregnant women?

Pub talk

Next time you're slapping silver into one of those wonderful pub CD jukeboxes, you can take the opportunity to fascinate friends rigid with some more computer trivia.

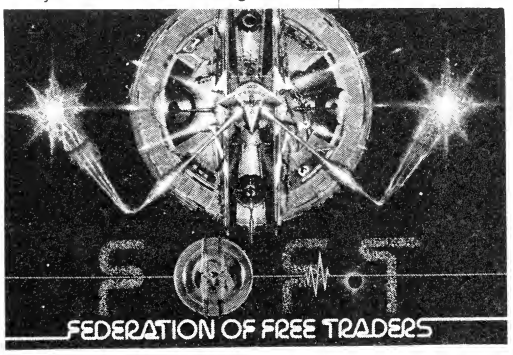
Apparently, the machines are controlled by none other than an Acorn master board. One of the board's functions is to monitor which songs are being played the most, opening up the possibility of a national jukebox chart...

BRING 'EM BACK

Gremlin calls back FOFT as gremlins hit production

Gremlin's big name ST title *Federation of Free Traders* has hit problems, with the firm calling back whole batches of the game.

Buyers have been calling the firm complaining that the *Elite*-type epic cannot be saved onto another disk – an essential option for serious players. There is also talk that a number of bugs are cropping up on the game. Gremlin has dismissed the latter complaint.



• FOFT: Gremlins and bugs

The saving problem appears to have been caused during the duplication of the game. Dealers and end users alike are being asked to send back problematic disks for replacements. Gremlin refused to be drawn on the extent of the problem saying only that it was "a couple of batches".

FOFT has been two and a half years in the making and, in the main, has been received warmly by the reviewing fraternity.

Gremlin says that bug complaints are simply coming from people who find the game difficult: "It's a very complicated game and when people get stuck they think it must be a bug," explained a spokesperson.

Various experienced gamers, though, have reported genuine bugs. Indeed, the game's programmer Paul Blythe told *Express*: "The game is so big that there a bound to be a few bugs. We had people playtesting it for a week non-stop but some will always get through." He added: "I made a few mistakes on the manual as well." Those bugs which have been reported are being ironed out for a remastered version of the game.

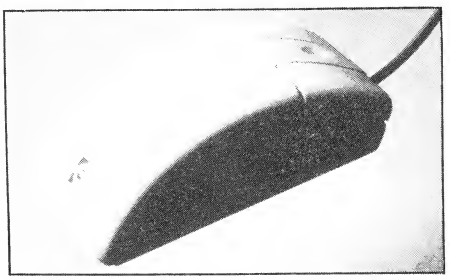
Budgeting on success

While the rest of us are quaking in our mortgaged boots for the Government's next budget, Topologika has gleefully relaunched its Yes Chancellor *for the Nimbus and Archimedes. The game puts you in the shoes of Nigel Lawson, with the task of balancing Britain's invariably precarious finances. It's already on virtually every format imaginable. The new version costs £17.50. More on 0733 244862.*

"Radical" mouse scuttles out

First there was Konix with its hand held joystick – now comes Logitech with its "ergonomically designed " mouse.

The firm has launched a new £95 mouse which "fits into your hand" and it claims the new idea will sweep the market. The new Logitech mouse is available in both Bus and Serial versions and comes with an interface program *Pop Up DOS*.



• Logitech's ergo mouse: Cogito ergo mus

"If you cup your hand on the desk the mouse will fit into it," offered Logitech's Nick Pearson. "We've sold two million mice already and so we've thought very carefully about our new model. This is a revolutionary and radical step."

Hard disk protection launched

Computer novices worried about the health of their hard disks are being pitched by Focus Systems with its *P C Checkdisk*.

The program costs £79 and can be loaded into any PC hard disk. Users can then run it whenever they please and check that all's well on the disk.

It will check that the hard disk is not overloaded and that the read/write head has not become worn. This, the firm says, can save hours replacing lossed data through hard disks corrupting or crashing. "It's the only product of its kind," said a spokesman. "There are a lot of people who want to safeguard their hard disk data."

Two bites of the apple

• The Beatles: Pipped again?

Apple, the company set up by The Beatles in their hippy heyday, has entered into a legal dispute with Apple, the company responsible for the Macintosh computer.

Apple Corps – owned by Paul McCartney, Ringo Starr, George Harrison and the John Lennon estate – is suing Apple Computer for alleged misuse of the famous half eaten apple logo on some of its musical related products.

According to The Beatles, Apple Computer agreed at the beginning of the decade to use an orange as the logo on its musical synthesising products rather than an apple. The fruit was registered by the late John Lennon as the company's trademark in 1967 when Apple Corps was founded.

The Beatles' lawyers say that they have only become aware of Apple Computer music related products using the Apple logo last year – some of the disputed products go back as far as 1984 though. These include a MIDI interface and two high end apple machines, the IIGS and IIE.

TOP 20 *Full Price* GAMES

1	**Robocop** OCEAN	*Spectrum, C64, CPC*
2	**Operation Wolf** OCEAN	*Spectrum, C64, CPC, ST, Amiga*
3	**Dragon Ninja** OCEAN	*Spectrum, C64, CPC*
4	**Afterburner** ACTIVISION	*Spectrum, C64, CPC, ST*
5	**E. H. Int. Soccer** AUDIOGENIC	*Spectrum, C64*
6	**Thunder Blade** US GOLD	*Spectrum, C64, CPC, ST, Amiga*
7	**Falcon** MIRRORSOFT	*ST, Amiga, PC*
8	**WEC Le Mans** IMAGINE	*Spectrum, C64, CPC, ST, Amiga*
9	**Double Dragon** MELBOURNE HOUSE	*Spectrum, C64, ST, Amiga*
10	**Fun School 2** DATABASE	*Spectrum, C64, CPC, BBC*
11	**Football Manager 2** ADDICTIVE	*Spectrum, C64, CPC, ST, Amiga, PC*
12	**Batman** OCEAN	*Spectrum, C64, CPC, ST, Amiga*
13	**In Crowd** OCEAN	*Spec, C64, CPC*
14	**Giants** US GOLD	*Spec, C64, CPC*
15	**R-Type** ELECTRIC DREAMS	*Spectrum, C64, CPC, ST*
16	**War in M. Earth** MELBOURNE HOUSE	*Spec, CPC*
17	**Last Ninja 2** SYSTEM 3	*Spectrum, C64, CPC*
18	**Pacmania** GRAND SLAM	*Spec, C64, CPC, ST, Amiga, MSX*
19	**Four Soccer Sims** CODE MASTERS	*Spec, C64, CPC,*
20	**Heroes of the Lance** US GOLD	*Spectrum, C64, CPC, ST, Amiga, PC*

TOP TEN *Budget* GAMES

1	**Joe Blade 2** PLAYERS	*Spectrum, C64, CPC, BBC, C16, Electron*
2	**Trs. Island Dizzy** CODE MASTERS	*Spec, CPC*
3	**Commando** ENCORE	*Spectrum, C64, CPC, BBC, C16*
4	**World Games** KIXX	*Spectrum, C64, CPC, MSX*
5	**Knightmare** MASTERTRONIC	*Spectrum, C64, CPC*
6	**ACE 2** CASCADE	*Spectrum, C64, CPC*
7	**Int. Rugby Sim.** CODE MASTERS	*Spectrum, C64, CPC*
8	**Street Gang** PLAYERS	*Spectrum, C64, CPC*
9	**SAS Combat** CODE MASTERS	*Spectrum, CPC*
10	**Ad. Pinball Sim** CODE MASTERS	*Spectrum, C64, CPC*

RE re-entry • NE new entry • Last week's positions ↓
Compiled by Gallup

The charts shown are based on the Open Market, that is, retailers who stock a broad range of products. All charts shown are copyright of Gallup.

And now what...?

Aside from sundry bundles throughout the year, it is still unlikely that Amstrad will offer anything new on the computer front in 1989. This is despite the vaguest of vague hints dropped last week by chairman Alan Sugar to trade paper *CTW*.

He said that there would "not necessarily" be any new computers, but added: "There are always new products under development. What we bring out will probably be along the lines of what you might call the office equipment industry – products using computer technology."

In turn, this comment has prompted yet more speculation about an Amstrad fax machine – a rumour which first saw the light of day back in the autumn of 1987. Nonetheless, a cheap Amstrad fax card for PCs now looks more than probable to appear this year.

Amstrad's problem with new computers is that its current line-up – games, word processing, cheap PCs and full-blown business machines – contains few obvious gaps. An ST or Amiga equivalent is lacking, but Sugar's firm has shown a declining interest in the leisure market in recent times.

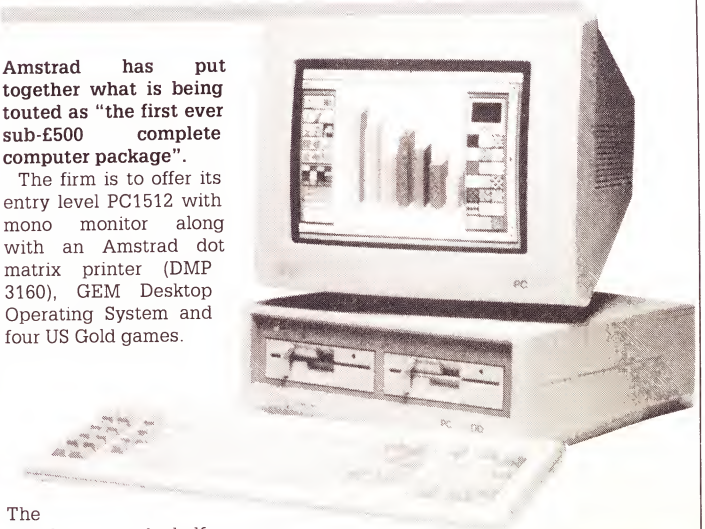
• Sugar: Speculation but no hard fax

Sugar also told *CTW* that the ill-starred PC 200 will probably be relaunched in the autumn, following its comparative failure to date.

THE ALL-IN-ONE £500 PC ARRIVES

Amstrad has put together what is being touted as "the first ever sub-£500 complete computer package".

The firm is to offer its entry level PC1512 with mono monitor along with an Amstrad dot matrix printer (DMP 3160), GEM Desktop Operating System and four US Gold games.



• PC1512: New assault on first-time market

The popular two and a half year old machine will also come with the Migent *Ability* business program. The price will be £499 – £100 more than the normal price of the machine. This offer will run until the end of April.

In the past Amstrad has often been commended for offering attractive 'all-in-one' deals to first time computer users. The idea of giving away a printer appears to be gaining popularity. Commodore recently put together a similar deal for its PC10.

As computing becomes more appealing to new users, so the manufacturers are starting to cater for those who would rather not shop around for essentials such as a printer. "It's a question of us not lying down and always having something to boost the machines," said an Amstrad spokesman. "It's a terrific deal."

Amstrad has also reintroduced its £50 off the PCW 9512. TV watchers can expect to see Stanley Unwin back on the box and babbling about the virtues of Amstrad word processors.

Video graphics show looms

Budding video presentation buffs are being advised to take a trip to the forthcoming Presentations '89 exhibition .

It is being touted as the first show which integrates computer and video graphics. The show will be dedicated to the mixing of video with computer graphics – an increasingly popular art form.

Presentations '89 will run alongside the International DTP and Professional Publishing Show at the new Arena Exhibition Centre in the London Docklands from October 4th to the 6th. More details on 0625 878888.

Long running theories that computer gaming turns perfectly normal people into raving psychopaths may have some substance, judging by the recent activities of leading software developers MicroProse and Electronic Arts.

This group of sorry looking individuals spend their lives dealing with, developing and testing war simulations and other games from the two firms. The result is that they deem it a jolly good wheeze to spend a Saturday afternoon prancing around in dodgy combat gear squirting paint at each other through toy guns.

The two companies recently faced each other for a "combat game" simulation of MicroProse's *Airborne Ranger*. Gung ho MicroProse came out tops on the day proving (it says here) "our status as the premier software simulation company".

House Master

A sound sampler for the ST is to be launched by Software Horizons which includes House music demo software. *Mastersound* costs £35.

Sinclair's wafer: out of the closet

As was widely expected, Sir Clive Sinclair's Anamartic has at last revealed some of its plans for a revolutionary new wafer scale storage media.

Anamartic is jointly owned by Sir Clive and Japanese giant Fujitsu. At the International Solid State Circuits in new York last week, Sir Clive presented a paper outlining his plans for the technology. Less than two months ago Sir Clive told *Express* that the new chips would "transform" computing. "It will mean a one thousand times increase in the speed of memory access," he said.

Over the next few weeks the publicity shy Anamartic will be making a series of announcements. Anamartic believes that the new chips will be considerably cheaper than today's standards because they require fewer manufacturing processes. Sinclair said last week that first deliveries of the memory modules will be made to Tandem, "soon". That firm will use the product for mainframe backing storage.

Anamartic is now working on increasing the amount of intelligence on the wafer.

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Alien Legion	24.99	Early March	Gainstar
Artura	19.99	March 1	Gremlin
Baa	19.95	Out Now	Psygnosis/Psyclapse
Barbarian II	19.99	March/April	Palace
Blasteroids	24.99	Late March	Image Works
Cosmic Pirate	19.99	Imminent	Outlaw
Crazy Cars II	24.99	March 21	Titus
D.N.A. Warrior	19.99	Out Now	Artronic
Dark Fusion	19.99	End Feb	Gremlin
Dragon Ninja	24.95	Easter	Imagine
Dragonscape	19.95	March 14	Software Horizons
Dreamland	24.99	Early March	Gainstar
Dugger	19.95	Out Now	Linel
Fun School 2	19.95	March 7	Database
Gary Lineker's Hotshots	19.99	Mid March	Gremlin
Kenny Dalglish's Soccer Manager	19.95	Out Now	Cognito
Lords Of The Rising Sun	29.99	March 22	Cinemaware
Operation Neptune	24.95	Out Now	Infogrames
R-Type	24.99	Late March	Electric Dreams
Shoot-Em-Up Construction Kit	24.99	March	Outlaw
Space Quest II	24.99	Out Now	Sierra
Super Hang-On	24.99	Imminent	Electric Dreams
Tech	24.99	Early March	Gainstar
The Champ	24.95	Early March	Linel
Triad	29.99	Out Now	Mirrorsoft
Virus Infection Protection	29.99	Out Now	Discovery
Zany Golf	24.95	Out Now	Electronic Arts

ATARI ST

Alien Legion	24.99	Early March	Gainstar
Andes Attack	9.95	Out Now	Llamasoft
Barbarian II	19.99	Out Now	Palace
Blasteroids	24.99	Late March	Image Works
Chaos Strikes Back	14.99	Early March	Mirrorsoft/FTL
Cosmic Pirate	19.99	Imminent	Outlaw
Dark Fusion	19.99	End Feb	Gremlin
Dragon Ninja	19.95	Easter	Imagine
Dugger	19.95	Out Now	Linel
F-16 Combat Pilot	24.95	Imminent	Digital Integration
Federation Of Free Traders	29.99	Out Now	Gremlin
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Operation Neptune	24.95	Out Now	Infogrames
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Rocket Ranger	24.99	March	Cinemaware
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Skyfox II	24.95	March	Electronic Arts
STOS Compiler	19.95	End March	Mandarin
STOS Maestro	24.95	End March	Mandarin
STOS Maestro Plus (inc. Hardware)	69.95	End March	Mandarin
STOS Sprites 600	14.95	March 21	Mandarin
Thunderwing	19.95	Out Now	Artronic

Out Now = Released within the last month
Imminent = Expected at time of publication

SPECTRUM +3

Barbarian II	D	14.99	Out Now	Palace
Dark Fusion	D	12.99	End Feb	Gremlin
Dragon Ninja	D	14.95	Out Now	Imagine
Gary Lineker's Hotshots	D	12.99	February 27	Gremlin
Purple Saturn Day	D	14.95	March	Exxos

SPECTRUM

Blasteroids	T	9.99	Late March	Image Works
Captain Blood	T	9.95	Imminent	Exxos
Cup Football	T	2.99	March 16	D & H Games
D.N.A. Warrior	T	9.99	Out Now	Artronic
Dark Fusion	T	7.99	End Feb	Gremlin
Dragon Ninja	T	8.95	Out Now	Imagine
Gary Lineker's Hotshots	T	7.99	February 27	Gremlin
Purple Saturn Day	T	9.95	March	Exxos
Soccer Q	T	2.99	March 16	D & H Games

IBM & COMPATIBLES

Abrams Battle Tank	3.5+5.25	24.99	Early March	Electronic Arts
Billiards	5.25	19.95	February	Ere/Infogrames
Crazy Cars II	5.25	24.99	Early April	Titus
Dragon Ninja	5.25	19.95	March	Imagine
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Final Frontier	3.5+5.25	24.99	March	PSS
Firezone	5.25	24.99	Out Now	PSS
Operation Neptune	5.25	24.95	March	Infogrames
Sinbad	5.25	29.99	March	Cinemaware

AMSTRAD CPC

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Barbarian II	T	9.99	March/April	Palace
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Blasteroids	T	9.99	Late March	Image Works
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Action Service	T	9.95	Imminent	Cobra/Infogrames	Gary Lineker's Hotshots	D	14.99	March 2	Gremlin
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Blasteroids	T	9.99	Late March	Image Works	Grand Prix Circuit	D	14.95	March	Accolade/EA
D.N.A. Warrior	D	14.99	Out Now	Artronic	Hostages	D	14.95	Early March	Infogrames
D.N.A. Warrior	T	9.99	Out Now	Artronic	Hostages	T	9.95	Early March	Infogrames
Dark Fusion	D	14.99	End Feb	Gremlin	Purple Saturn Day	D	14.95	March	Exxos
Dark Fusion	T	9.99	End Feb	Gremlin	Purple Saturn Day	T	9.95	March	Exxos
Dragon Ninja	D	14.95	Out Now	Imagine	Rocket Ranger	D	19.99	Out Now	Cinemaware
Dragon Ninja	T	9.95	Out Now	Imagine	Soccer Q	T	2.99	March 16	D & H Games
Final Frontier	D	17.99	March	PSS	Warlock's Quest	D	14.95	Out Now	Ere/Infogrames
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Firezone	D	17.99	Out Now	PSS					

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I am a seventeen year old student who takes a great interest in computing and therefore a great interest in your magazine.

I do not however own a computer (because I cannot afford one), but I still buy your excellent magazine because I am studying the subject at 'A' level and your magazine helps by keeping me up to date with all the latest news and innovations.

In *Express* 13, R W Norris was asking about loans for the Amiga from the NUS. I am studying at college and none of the teachers seem to be aware of it. I would be very grateful if you could put some light on the matter as I would very much like to buy a computer.

Zubair Dayd, Leicester, Leics

● ***A reminder that under this scheme, you can borrow money from the bank to buy an Amiga to use for your student work (and not just to play games, honest, Mr Bank Manager). You just pay off the interest until you get a job after graduating when you clear the outstanding balance. The best people to approach are probably the NUS themselves. If there isn't an NUS shop at your college you can get details on 0457 468003.***

While the Amiga would be a great machine for anyone doing Art & Design, Music or similar subjects, if you just want a study tool, cheaper options exist. The CPC with a budget printer, or perhaps even better a PCW, will do everything you could reasonably want for essay writing and thesis preparation. (LocoScript 2 on the PCW does Greek, Russian and all mathematical symbols up to post-doc level, and is also available in Welsh, Arabic and Urdu versions). You could pick up a second hand one cheap (try the magazines Micro Mart, Computer Shopper etc.) and will easily persuade your bank manager to give you a loan to buy one of these – they're bound to see these as more serious and legitimate machines and probably have one themselves at home.

AYE, THERE'S THE RUBBISH

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PIRACY, OR WHAT?

Is what I am doing an act of piracy? No, don't send the squad car round, just listen.

I used to own a Spectrum outfit consisting of 48K Speccy (with custom ROM), twin micro-drives and Brother HR5 printer (serial model). Now on this set-up I used to do word processing and a league table system or the local skittles league. For this I bought a program called the 'Run Your Own League System' from a firm called Silicon Joy, who are no longer trading. This program was 100% Sinclair Basic.

Now I have an Atari ST system with C-Itoh Plotter and the program is not available for the ST. So, I nipped around to a friend's house, borrowed his Spectrum and have transferred the entire program as an ASCII file to the ST using a comms program. I am now editing the program using 1st word to be compatible with ST BASIC.

If I get the program fully running, is it a pirate copy? Will I get clapped in irons or keel-hauled? Or does it come under the heading of a back-up copy for my own use? Or if the company no longer trades, who owns the rights to the program (there is no author's name)? Is it PD? Can I distribute it? I would appreciate any comments or suggestions.

Clive Parker, Pill, Bristol

● ***Well, according to the Federation Against Software Theft (01-430 2408) the good news is that you're probably OK in this instance and can use your adapted program. But there are some important points to be made.***

When you buy a program, you buy the licence to use it, on any one machine at any one time. So if you transfer it from your Speccy to your ST and use it on that and you're not breaking any law – but you must delete any copies you have on the original machine, on the hard disc or on any floppies.

The owners of the copyright of a program (the distributors or the authors) can determine any conditions they like. They invariably specify one machine at one time though they could say two machines at a time, if it was a two-machine network game for example.

If you modify the program – edit the BASIC listing, rewrite it in C or whatever – you need the consent of the copyright owner. If the only company distributing it has gone out of business, and you make reasonable steps to find out the current owners of copyright but they cannot be traced, then you can probably assume it's OK to modify it. But you'd be safest not distributing it as free public domain software unless you had express written permission to do that from the copyright owners!

Expensive programs – bespoke accounting systems for businesses, for instance – can be put in 'escrow' by a company that goes out of business. Here the code is deposited with some authority (say the National Computing Centre) and kept safe so that a user can still have access to it. This is extremely unlikely in your case.

Anyway, for bringing up a nice legal point, you'll be receiving the mystery prize this week for the most interesting letter. Guaranteed non-pirate and usable without modification on your ST.

MYSTERY PRIZE WINNER

Dear Reader

Three pages this week, packed with another selection from our postbag. Got something to say? Make your voice heard in computing's liveliest letters page!

Send your contributions to:

Express Mail, 4 Queen Street, Bath, Avon BA1 1EJ

PS. Sorry, NO personal replies, whether you include an SAE or not. We're too busy putting Express together!

● ***Well, Mr Thomas, if all the letters we receive in a year were laid end to end, they would stretch from Bath to a spot near Easington, in County Durham. To put it another way, if we printed every letter that was sent to us, each issue of Express would have 165 pages, and would cost £5.46! And if all the staples were removed and melted down, the steel could contaminate over 30,000 packs of butter! And if all the staples were removed and piled on top of all the issues of Express for one year, and the packs of butter laid on top of that, they would reach to the ozone layer! So as you can see, we can't print every one.***

Incidentally we've given your letter to the Bristol Friends of the Earth to recycle. Here's a tip: if you want to write a letter like that above to Express, why not send it straight to them and save us the trouble? Their number is 0272 724002.

PHYSICIAN, FEEL THYSELF

I wonder why people actually buy games like 'Emmanuelle', 'Teenage Queen' or 'Strip Poker'? the implication always seems to be that it's just a bit of harmless fun for good ol' boys, and maybe it is.

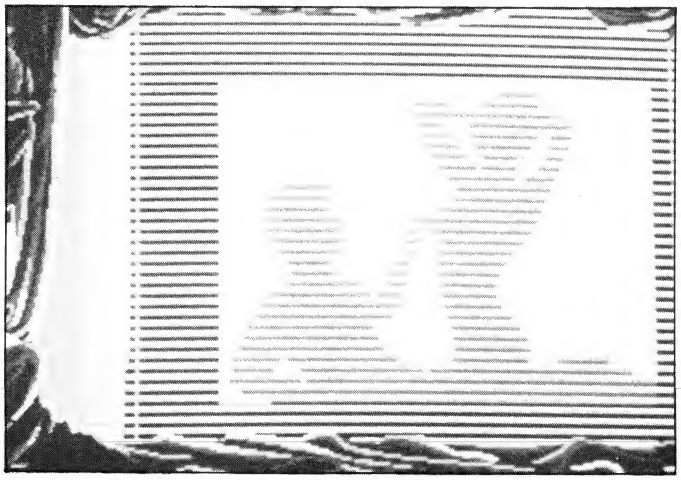
Personally though, I think that most of these games are bought by furtive self-manipulators who are either too young or lack the front to buy their porn from a newsagent. Now then, where's that keyboard cover...

Stephen Mercer, Shaftesbury, Dorset

● ***I think the short answer is, erotic does not necessarily mean sexist. There's nothing wrong with erotic games per se (just as eroticism in art or the cinema can be valid) but there's everything wrong (in my book) with sexist games – i.e. ones setting up a stereotype model for women (and men) which all too many think is the way women (and men) should behave.***

At the moment, the games I've seen are all firmly on the sexist side of the thin line dividing the two areas. As more and more games like those you mention appear (and appear they will, given increasingly powerful graphics in gaming) there may yet be 'legitimate' erotic software to review.

One thing is certain. In your local newsagents the computer magazines will be in the row under the porn mags. Whether this is so you can easily find the computermags, or vice versa, I can't say.



• Erotic? Sexist? Or just a very short doctor using a stethoscope on a very tall woman? See *Physician, feel thyself*

POSITIVE ELECTRONS

I was reading your BBC column recently in which you said the Electron was discontinued. This is not so. You can still buy the Electron from Slogger Ltd of Bristol and Pres Hardware. And if you buy the magazine Electron User you will find out where you can buy 64K and also buy Mode 7. The Electron is still the best buy!

By the way, the reason there is more software for Spectrums than Commodores is because they are easy to write for.

Mr J A Isard, Penge, London

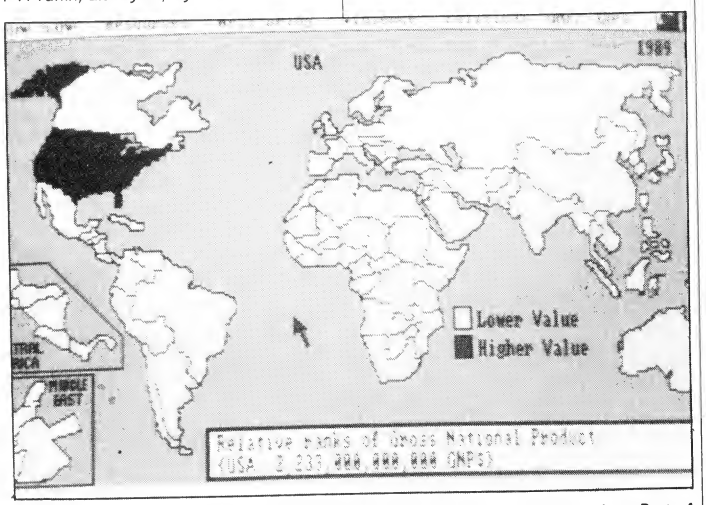
● ***Thanks for the info, but we haven't been able to trace phone numbers for any of the concerns you name. Anyone help out?***

WHERE CAN I GO FOR A BOP

Your review of "Balance of Power 1990" (Express 15) was a cruel blow; I have been trying to get the original version on 3.5" disk for my twin drive Amstrad PPC 640 in Carmarthen, Cardigan, and Aberystwyth, all without success.

Would you be good enough to tell me where I can obtain this and similar programmes?

P A Tuffin, Llandysul, Dyfed



• Balance of Power so far: Wales 0, Rest of World 263 (next week – All Ireland vs. Rest of Ireland). See *Where can I go for a BOP?*

● ***Mindscape, which makes Balance of Power 1990, says there's a PC version in the pipeline (on both 5.25 and 3.5 inch formats) which will be out "in the middle of the year". (See also the news story on BOP in this issue). If you can't get it, even in a metropolis like Carmarthen, Cardigan, or Aberystwyth, try a mail order advertiser in Express when it comes out.***

How well the graphics will show up on your PPC screen is open to doubt though, and an external monitor to the PPC will only display text, not graphics.

For a general guide to PC games, why not try one of our sister magazines, PC Plus? It's in your newsagents even as you read this.

REDUCED POWER USER

I read with great interest that Commodore say that all Amigas are the same under the keyboard (*Express Mail* 14). This may be true but all Amiga power packs are definitely not the same. The power pack on my new Amiga lasted just 6 weeks. My friend was luckier than me as his power pack lasted 8 weeks.

Making a few enquiries revealed, from a retailer, that they had had quite a few of the latest batch of Amigas returned because of power pack failure. (Some of the power packs failed the first time they were switched on.) This retailer then discovered that Commodore are now supplying Amigas with a power pack which has an output of 2.5v against the 5V power packs sold with the earlier Amigas.

As far as I can find out this means that the new power packs (2.5V) are just capable of running the Amiga but have very little, if any, spare capacity left over. This means that any slight increase in power demand causes the power pack to overload. Commodore, it would appear, had neglected to tell any of the retailers that I spoke to that they were downgrading their power packs nor, may I add, did they inform the computer buying public who spend their hard earned cash to buy Commodore products.

So never mind about whether the ST is better than the Amiga as even an old 48K Speccie is better than a £400 state of the art, up to date pile of useless, inert plastic.

Another point for prospective Commodore purchasers to consider is Commodore's new system for handling damaged/faulty goods. I was informed that I had to return the whole computer package, in its original packaging to the shop where I purchased it. The whole package had to be sent off (even although it was only the power pack that had failed) for testing and repair. The retailer said that he was not allowed by Commodore to offer replacements for faulty goods. (Isn't this a contravention of your statutory rights under the Sale of Goods Act?)

So here I sit £700 out of pocket (I bought an external disk drive, half meg expansion pack, etc.) silently cursing Commodore and sticking pins into a Commodore Logo.

After three solid years of getting my daily fix on my computer (I used to own a CBM 64), going cold turkey is doing strange things to my mind. I have even started talking to my wife.

S Rankin, Kilmarnock, Scotland

● ***Commodore declined to comment on this as the relevant experts were at the Which Computer? Show. It sounds like you're right about the Sale of Goods Act: if something is mechanically defective you can get another one from the retailer. You don't have to return the whole caboodle. Anyway, I'm sure Commodore will be happy to reply: watch this space.***

Cold Turkey symptoms are many and varied. I heard of one chap whose copy of Clock Chess '89 got corrupted, and so he had to go out and buy a chess board, and find someone to play against!

Now you are talking to your wife, what will you do when the Amiga comes back? Will you have withdrawal symptoms the other way when you start spending your evenings in front of the computer again? Perhaps some games house will bring out a Wife Simulator...

ROLL ON VIRUSES!

Three cheers (well, all right then – 3.5 cheers) for no more letters on hackers and piracy, except mine, of course!

Viruses are good for us. Enough damage, and the manufacturers might be forced to provide some security with state-of-the-art improvements, instead of the non-stop dreary procession of follow-my-leader me-too-I'm-compatibles.

Why should we keep on sticking things in holes! Programs, particularly operating systems, should be on ROM chips – or better still on smart-cards for instant access. No virus trouble then, eh?

Same for data storage, this should be on WORM optical drives – with their storage capacity who cares if there are one or two duplicated files. Of course, we would still need a floppy disk to store our temporary part-files (we do all make continuous part saves of our documents in case the cat pulls the plug out, don't we?) but once its printed, final save is poison-proof, innit?

I know, I know, I can hear the screams already. What about the cost? What about upgrades? When did anyone last get a free upgrade? – mass-production of CD-ROMs combined with CD audio players should cure the first. And if it makes the buggers debug their £3,500 software packages before they release them, instead of six years later with v3.3, so much the better!

Drastic maybe, but if you've got a better idea to force the industry to get its head out of its bum, please enlighten me.

John Smart, Hitchin, Herts

BUT THE AMIGA HARDLY EVER CRA...

I would like to take this opportunity to congratulate you on producing a weekly magazine consisting of more news and views on the computing scene than adverts and at a reasonable price.

Anyone who is considering buying a computer which they intend to upgrade with add-ons should listen to my tale. I bought an Amiga A500 with monitor and software from a shop in Leicester. Some months later I purchased a printer and more software from the same shop. Again I started saving my money until I had enough to buy extra memory and disk drive from the same shop. The memory worked perfect but unfortunately the computer became slow to load Workbench and crashed when attempting to do anything once the drive was connected. I took the drive and computer to the shop to be checked where it was found the Amiga was at fault. The assistant asked how long I had had the machine and when I said just over the year by about a month told me the warranty did not cover it even though he agreed with me that the fault had probably been in the computer since I bought it. Legally he may be correct but morally I don't think so.

If you are going to buy intending to get the add-ons later, ask to have the machine tested with extra drives etc., before leaving the shop, that way you may save yourself a repair bill. I had spent nearly £1,500 in that shop, the repair will cost about £70. As you may have guessed I will not be returning to that shop when I save for the other extras I want for my computer, others will get my custom.

I enjoy the longstanding debate "my computer is better..." so please allow it to continue. My own thoughts on the matter are that anyone with sense will buy the best that they can afford and not worry what others have.

Please start a column on adventures as soon as possible which should in my opinion include the creation, as well as playing, of them. You will then keep many of your readers very happy.

P Bennett, Long Buckby, Northants

● ***Adventure column? Hmm. I'm not convinced. Adventures are reviewed along with other games in the Games section, and tips on specific adventure games can be covered quite adequately in the machine-specific sections and one-off subjects can be done as features (we're planning one on games construction kits shortly).***

TEXALL SORTS

May I through your letters page advise all TI (Texas Instruments) 99/4A owners and members of TI 99/4A Users Group (UK) that the Club's AGM will be held on Saturday 17th June 1989 at the Romiley Centre, Romiley, Stockport from 10am to 5pm.

All are welcome to attend what we hope will be a very successful meeting. There will be plenty of interest for everyone including demonstrations and a Bring & Buy sale.

For further details, both about the meeting and anyone interested in joining, please contact either myself at the above address or the Membership Secretary at the following address:-

Peter Walker, 24 Bacons Drive, Cuffley, Herts, EN6 4DU Tel: 0707 873778

Christine M Bennett, Romiley, Stockport

● ***I promise not to make any cheap cracks about the meeting being held in a phone booth. Hope they turn out in droves.***

The Bring and Buy sale sounds intriguing: keyboard cosies? Home made soft toys in the shape of a mouse? Software to control your potted plants? Only joking.

KIDOLOGY

I very much enjoy reading New Computer Express and have recently taken out a subscription for a year. I find that the amount of ground you cover is most interesting and educational. For the record, the MSX feature has been useful to me for passing on information to my niece who has a Panasonic MSX, the QL corner featuring this unusual machine

fascinates me, I have more than a passing interest in PC Update, and being a PCW 8512 owner I do of course welcome PCW Patch.

I would welcome your views on computers and children. I am considering purchasing a computer for my four year old daughter. I would like her to grow up using computers from as early an age as possible but do not want to buy one too early.

I'm looking for an inexpensive introduction to game playing with a more comprehensive machine at some point in the future. The Atari 65XE, which comes with 10 games I believe, would only cost £80 and comes with datacorder and joystick. What do you think of this computer? I know that games are not available in the shops but I would not mind ordering by post provided there is a modest range available.

H Thomson, Aberfoyle, Scotland

● ***Sounds fine to me. The only disadvantage with the XE is the serious lack of software support, but if it's for use as a toy/ introductory machine this doesn't really matter. In fact it would be useful to your daughter at school (with* Mini Office, *perhaps, from Database Software) and she could do plenty of serious work on it. When she gets older computers will be even cheaper and more sophisticated than they are now, so it's hard to say what she would be looking at then; perhaps, in five years' time, you could get her an 'old-fashioned' Amiga second-hand for a hundred pounds or so.***

You could probably pick up a second hand model together with a load of games for £50 or less – check the* Exchange & Mart *style computer publications which are in abundance in your local WH Smiths or John Menzies. For mail-order software for the XE, try Silica Shop on 01 309 1111.

You're right to get your kids computer-literate from the beginning (school age sounds about the right time to me). Computing is quickly becoming just as important a skill as reading and writing; not just for utilitarian purposes like getting a job or doing club mailshots, but also (and increasingly) as a legitimate leisure activity in itself, like playing the piano or painting.

WHY THE PCW IS BETTER THAN AN AMIGA

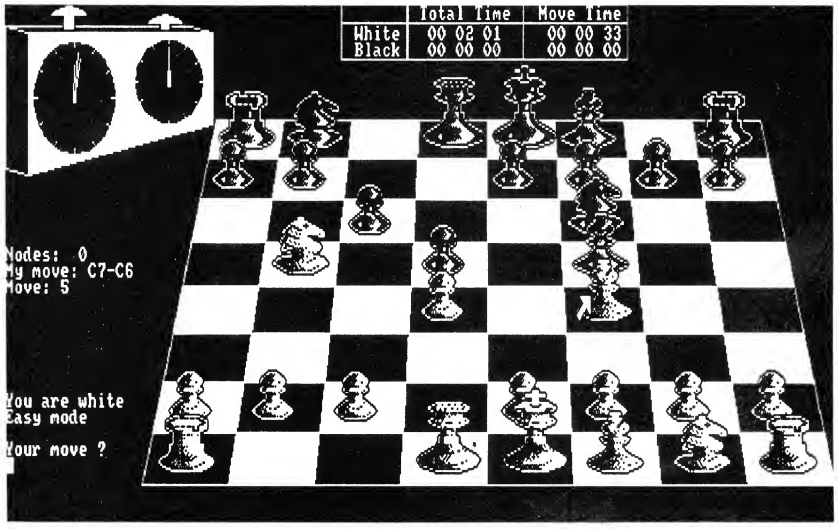
There is an increasing amount of "my computer is better than yours" argument in your fabulous magazine. *Express Mail* 15 contained an excellent Mystery Prize letter, but page 12 had a really terrible one, "Dross House." K Ault is an Amiga user who thinks that the sun shines out of his blitter chip, and this computer that he owns is the natural choice that anyone buying a computer should take.

I have never used an Amiga, but have used an Atari ST. For people who want to write games, I would recommend *STOS*. (Did you know that they were finding it hard to write *Elite* for the Amiga A500, whereas it was out on the 32K, 2 Mhz BBC B ages ago, and is already out on the Atari ST.) Never mind! I have also used (in fact I possess) an Amstrad PCW9512, and I realise that games are not its strength. I would not be parted with *LocoScript 2.21*, *LocoMail*, *LocoSpell* and *LocoFile* (all on one disk). Also, I have used an Apple Macintosh Plus, and Macintosh II, with a Laserwriter II NT and VIA Graphics. All this, and an Amstrad PC and Tandy PC.

The point of this letter is that to call an ST user a person with half a brain is really stupid, because I, the Mac User, may call the Amiga user a person with half a graphics capability. I, the PC User, might call the PCW User slowcoach, etc. etc.

But, when it comes to computers, everyone has their own preferences. If I could afford it, I would buy every computer possible. But I would never swap my PCW for an Amiga, because the printer would be what I miss. The PCW comes with a printer, monitor and disk drive, you see! So, Mr Ault, my PCW is better than your Amiga for what I want to do... word processing.

Timothy Gowen, Diss, Norfolk



• PCW Chess and Scrabble: ideal games for a dedicated word processing machine – as most PCW owners are. See *Why the PCW is better than the Amiga*

● ***Agreed, though the PCW is only underrated as a games machine because there are so few shoot-em-ups for it. Yet excellent PCW implementations of* Scrabble, Chess, Backgammon *and* Tetris *exist – all of which perform the impossible of outshining the ST and Amiga versions, and which anyway appeal more to the thinking person that is the typical PCW owner. It mystifies me still that* Elite *was never released on three inch disc...***

CAN I WRITE?

I'm very interested in computer games and I love playing them and talking about them.

How can I become a games reviewer for a computer magazine? Do I need any qualifications? Are there any courses that you know of? I hope you can help me and any advice would be most appreciated.

David Watton, London

● ***There are no courses and you certainly don't need any qualifications, although* Express's *Rik Haynes has a certificate for 25 yards Breast Stroke (Butlins, 1982) while Andy Storer has several Cub Scout badges.***

You do need to be able to write to order – i.e. the right number of words, in approximately the right order, with a reasonable number of full stops.

As to how you get in... that's really up to you, I'm afraid. There's no standard way. Have a look at all the magazines you can, and send in some stuff on spec to the ones whose style seems closest to yours – reviews of brand-new games, snippets of news you've heard, the odd article maybe. A phone call to the editor may help ('Would you be interested in an article on...?' rather than 'Gi's a job, I can do that!'). But don't expect miracles straight away!

Being a journo may not be the best-paid job in the world, but it beats working for a living.

I AM A TEECHUR, HONNEST

16 Febuary 1989:

I must inform you of a 'Network Virus' circulating around sub-urban and central London. The Virus runs on networks in schools and colleges. It's job – to destroy all the data held on/by the main frame and/or fileserver controlling the network system.

The virus called, 'Virus Version 3.02' has been discovered on a BBC Econet Network on a school in South London.

Reports have stated that another school in South London, Raynes Park, has also been effected by the same type of virus.

The message, 'Yeah Boy!! You've gotta virus!' appears on random computers on the network and the only way to get rid of it is to switch the machine off.

The virus seems to affect the BBC Micros and the Archimedes.

Data has already been lost on some school networks and the virus is spreading. If one school network has the virus – other schools will be affected very soon. Please warn the public about this crisis.

I regret I cannot give my name (God knows what they'd do to me if they found out I wrote this letter).

Please warn the public – before is just to late.

A very concerned Information Technology Teacher, South-West London.

● ***Ha ha! You can't fool me. I know an adolescent male's clumsy writing style when I see it. (I read lots of other computer weeklies, you see).***

A teacher wouldn't have written a letter like this (we've printed it exactly as you wrote it, mis-spellings and all): theirs would be correctly spelt with proper margins, and use such phrases as 'lickspittle running dogs of the Thatcherite military junta' liberally.

Bearing in mind the fact that criminals responsible for a crime – especially 'anonymous' crimes like hacking – like to let the world know about it through notes like this, we've passed your letter to the Bristol Police's Forensic department for fingerprint analysis. You should've used gloves when you wrote the letter, shouldn't you?

• When I agreed to let the lad have a mouse and something to keep it company, I didn't realise he meant an Apple Mac II... See *Kidology*

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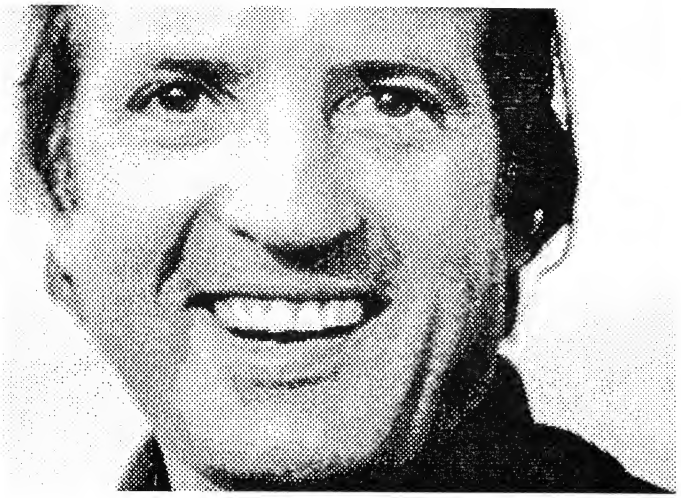

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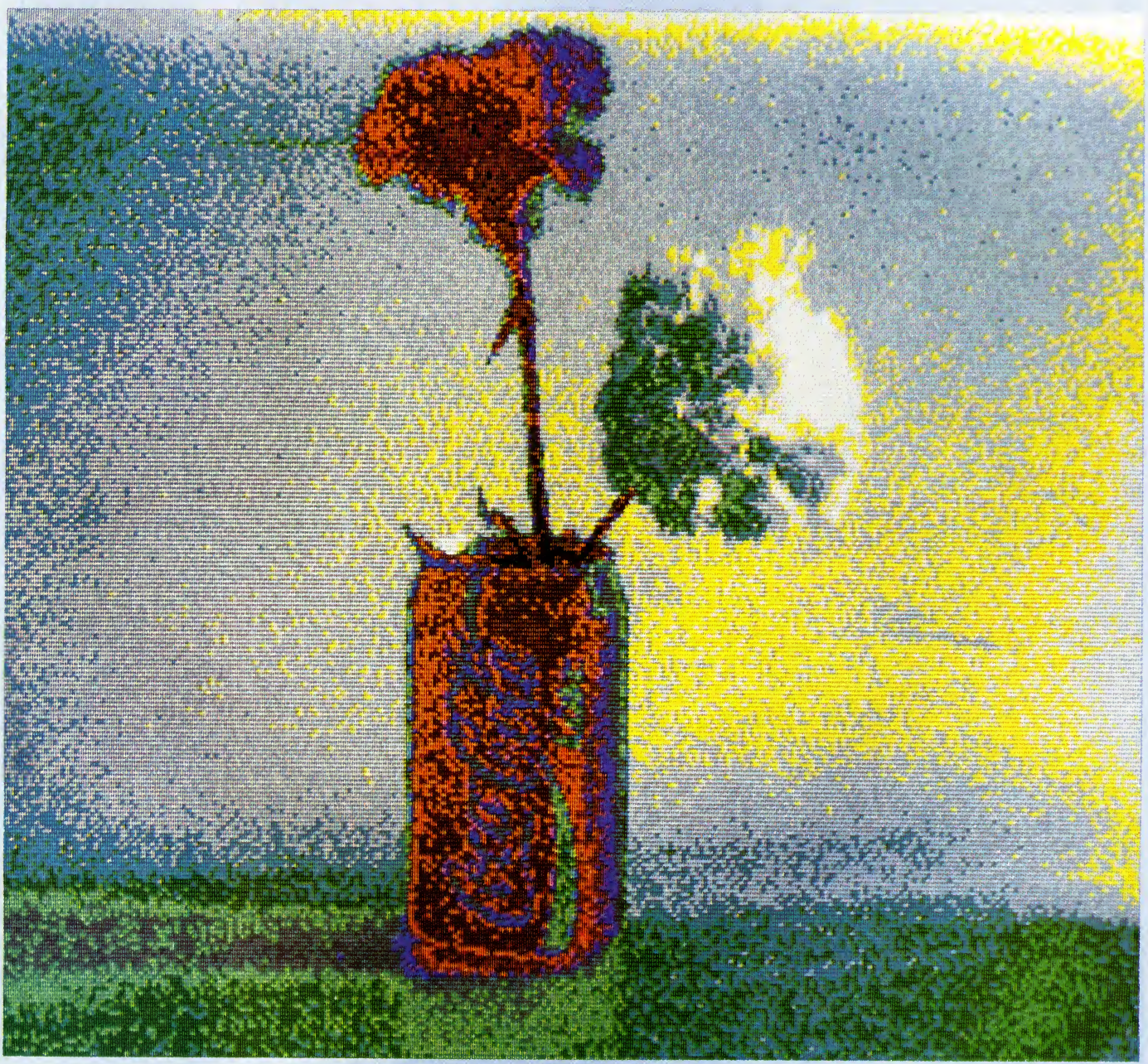
Let's get digital



Have you ever wanted to include spectacular and impressive visuals in your programs? Has the fact that you're useless at graphic design dissuaded you thus far? Have you wondered how the professionals can produce such life-like images in their programs? If your answer to all three questions is yes, then a video digitiser could be the device to make your visual dreams come true. Rik Haynes discovers how to transform a stick-man sprite into Arnold Schwarzenegger...

You don't have to look far in the world of games and demonstration software before you come across a digitised image. You can tell the image is digitised because it appears life-like but from a strange computerised perspective – an arrangement of shape and shading an artist would find difficult to mimic.

Video digitisers are a combination of hardware and software which allows you to take any video image, from either a VCR or video camera, and transform that analogue video information into digital data. A form understandable by your micro, so that it can translate the data into pixels to produce a normal screen display.

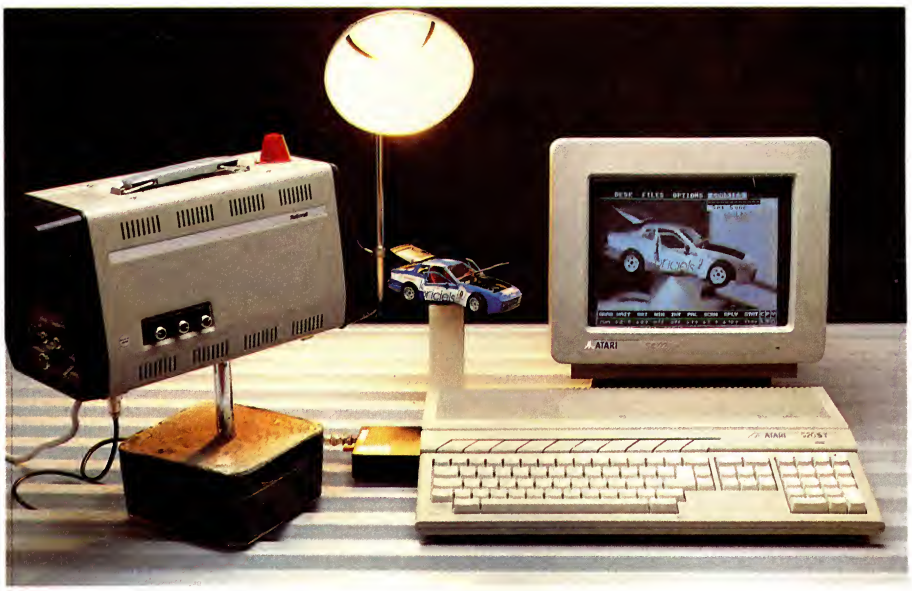
The time it takes to "capture" the video image depends on your digitiser's hardware and software specifications, but you can expect something in the region of 10 to 30 seconds.

Once the image has been captured into your micro's memory, your micro will treat that image the same as any other graphic display. Thus, you can use any program such as a graphic, paint or animation package to manipulate the image in the same way you would with your normal hand-drawn computer graphics. Except instead of being the normal circle, square or rectangle, your image could be a computerised life-like representation of a Space Shuttle, Coke Can or even yourself!

The possibilities are really limited only by your imagination – your choice of subject to digitise, and how to manipulate the image once it's digitised.

Of course there are drawbacks, namely the digitised image will not be as high a quality as the original video image. The results obtained depend entirely on the digitiser's hardware and software, the video equipment used, and the capabilities of your micro's graphics displays.

The last feature is perhaps the best indication as to why there are so many video digitisers available for the ST and the Amiga especially, because with their wide range of high quality graphic displays, plenty of on-board memory and fast central processors they're the best choice for developing, processing and displaying digitised images. However, whichever micro you own, there should be a video digitiser available for your machine somewhere.



Camera set up

Overall, a video digitiser will not only help you to overcome any lack of artistic skills, but it can also unleash a time-saving, exciting and thoroughly imaginative visual world on you and your micro.

After all, why bother going to the trouble of redrawing something when it already exists in real-life when you could digitise it? So, go forth and digitise... ●

Technobabble — Video Digitisers

This is a combination of hardware and software that takes a video image from either a video cassette recorder (VCR) or video camera and converts it into digital information. The computer then uses this to draw its own pixel representation of the video image, assigning each pixel the correct shade of colour or grey. A real-time video digitiser is a special form of video digitiser that takes a succession of video images and digitises them in real-time, allowing you to create a series of screens which can be displayed in sequence to give the illusion of animation.

• It only takes a few seconds to digitise a picture

• By digitising your own picture and using a graphics package to treat the result, you can improve your appearance (for a passport photo, for example). See if you can spot the original from the improved version.

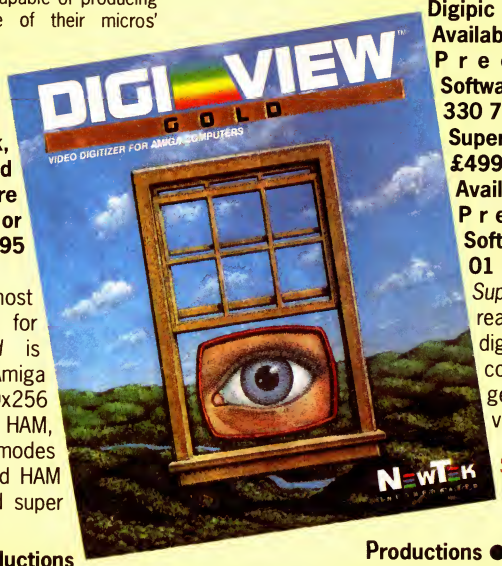
Best Buys

Of course, with most consumer goods you get what you pay for – and video digitisers are no exception. Video digitiser prices start from around £100 for the ST, Amiga or PC, with prices of £200 to £250 not uncommon. Try to purchase the latest version of the digitiser's hardware and software, because most digitiser manufacturers are constantly developing and improving their products' performance. Unfortunately, owners of 8-bit machines will find video digitisers hard to find, relatively expensive and capable of producing only indifferent results because of their micros' graphics hardware limitations.

AMIGA

Digi-View Gold ● NewTek, USA ● £129.95 ● Imported from the US by Amiga Centre Scotland on 031 5574242 or HB Marketing on 0895 444433.

The first – and probably most popular – digitising package for the Amiga, *Digi-View Gold* is capable of digitising in all the Amiga resolution modes in PAL – 320x256 to 768x580 including HAM, overscan and extra halfbrite modes and includes and an Enhanced HAM mode for 4096+ colours and super fine detail.



Vidi-Amiga ● Rombo Productions ● £99.95 ● Available shortly from Rombo on 0506 414631

After its great success with Vidi-ST, Rombo Productions is putting the finishing touches to the Amiga version, which will digitise real-time images in 16 shades of grey at a rate of 5 frames per second.

Perfect Vision ● SunRize Industries, USA ● £199 ● Imported from the US by Amiga Centre Scotland on 031 5574242

Perfect Vision is a real-time video-digitiser capable of digitising – in one-sixtieth of a second – a 16 grey scale or HAM picture, with a resolution of 320x200 to 320x400.

Live! ● A-Squared Distributions, USA ● $295 ● Soon to be imported (price and availability to be announced) by Amiga Centre Scotland on 031 5574242

Live! is a real-time video digitiser with a digitising rate of 15 frames per second (the normal video frame rate is 30 frames per second) in 32-colour or HAM modes.

Other video digitisers available for the Amiga include:

Digipic ● £299 ● Available from Precision Software on 01 330 7166

Superpic ● £499 + VAT ● Available from Precision Software on 01 330 7166

Superpic is a real-time video digitiser incorporating a genlock device.

ST

Vidi-ST ● Rombo Productions ● £99.95 ● Available from Rombo on 0506 414631

Vidi-ST is a great budget real-time video digitiser which digitises 16 grey scale pictures at a rate of 12 frames per second.

Other video digitisers available for the ST include:

Silicon Animation Machine (SAM) ● Start Systems I £249.95 ● Real-time video digitiser available from Start on 0304 369364

Turbo Dizer ● £149.95 ● Available from Software Express on 021 543 9100

PC

Vidi-PC ● Rombo Productions ● £99.95 ● Available from Rombo on 0506 414631

A real-time video digitiser with a rate of between 1 and 5 frames per second, compatible with CGA, EGA and Hercules graphics modes. Rombo is currently working on a VGA version which will run under GEM environment and should be released within the next few months.

Electric Studio Digitiser (Entry-level) ● £175 plus VAT ● Available from Electric Studio on 0462 420222

Video digitiser compatible with CGA, EGA and Hercules graphics modes.

Electric Studio Digitiser (Visual Impressions) ● £375 plus VAT ● Available from Electric Studio on 0462 420222

A more professional video digitiser with higher specification, compatible with CGA, EGA, VGA and Hercules graphics modes.

SPECTRUM

Vidi-Spectrum ● Rombo Productions ● £34.95 ● Real-time video digitiser available from Rombo on 0506 414631

CPC

Vidi-CPC ● Rombo Productions ● £89.95 ● Real-time video digitiser available from Rombo on 0506 414631

PCW

Vidi-PCW ● Rombo Productions ● £99.95 ● Real-time video digitiser available from Rombo on 0506 414631

● Apologies to owners of other micros – we know there are video digitisers available for your machine, but we just couldn't track them down. If you have any information on the availability of a video digitiser for you micro then write to Express Mail, New Computer Express, Future Publishing Limited, 4 Queen Street, Bath BA1 1EJ.

What the future holds

Amiga owners are already well supported on the video digitising front, but NewTek – producer of the popular *Digi-View* range of Amiga digitising hardware and software – is currently developing the *Video Toaster*. Out later this year, *Video Toaster* is an exciting combination of a high-specification real-time video digitiser, genlock and effects device which should bring the power of professional video production to the average Amiga owner.

Digi-tech tips

When digitising from a video camera, the best results are obtained from a black and white model because these have better resolution than their colour counterparts. Don't worry that the digitised image will be in shades of grey, because you'll be able to change its palette to colour later on. Also, the image you're digitising must be still and well lit if you want the best results.

Always remember to use video leads to connect the video source to the digitiser hardware, because audio leads will drastically reduce the quality of the signal.

Finally, don't be disappointed by early results. Most digitisers' software allows you to change various settings for digitising scan rates, brightness, contrast, etc.

Keep experimenting, and you're bound to come up with a masterpiece sooner or later.

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The Language Barrier

To most of us, programming means BASIC. It's everyone's first and favourite language – but is only one of hundreds. Steve Patient looks at some of the alternatives...

Unless you're unlucky enough to do it for a living, writing programs is fun. Learning new languages increases the fun. But why bother when everything can be done in BASIC? Well, some things are better done in other languages. That's the reason there is more than one – they developed from different directions.

Just as German is good for shouting at peasants, Russian for writing long depressing novels and English for apologising, so different computer languages have their various strengths.

There are a lot of them about and they come in three flavours; interpreters, like most BASICs; semi-compilers, which compile to an intermediate code which needs a run time module to be present; and true compilers that produce programs you can run directly – .COM or .EXE files and so on.

Generally speaking, interpreters are the easiest to work with, while true compilers produce the fastest code. Semi compilers offer a greater range of built in functions than a compiler without giving any access to the original code; very important to professional programmers.

● ADA

After Ada Lovelace, daughter of Lord Byron, who wrote the first ever computer progams

Ada is an attempt by an American committee consisting of thousands of people to impose some sort of standard language on the world. A conglomeration of Pascal, C, Forth and every other language you have ever heard of, it has so many operators that you don't get a manual with it so much as a bookcase.

It's been adopted by the US Military and all other American departments as their official language, and other NATO countries are also being persuaded to take it on. (The eponymous Ada took to drink, drugs and gambling and died tragically young).

● ALGOL

Algorithmic Language

The language from which BASIC evolved, and similar in many ways though it has greater strengths in recursion. (Looking this up in the jokier computer glossaries reveals the entry: **recursion** (n.) *see* recursion).

Originally a mainframe language, as so many were, there are versions of Algol in many public domain libraries.

It's a classy sort of language; you can tell by the way every statement ends with a semi-colon.

● BCPL

Basic Computer Programming Language?

Like C, a powerful language because it has no types other than the 'word'. Do anything you like with data – but remember what you did, because the program won't.

● BASIC

Beginners All-purpose Symbolic Instruction Code

Although generally thought of as a 'beginner's language', BASIC is getting increasingly legitimate. As machines get faster and faster, writing arcade games in BASIC becomes more viable – on the Archimedes, for example – and the language is almost becoming fashionable. BASIC is clumsy and slow, because it is easy to use and hence extremely popular and useful.

● C

Because it was written after B – true that.

Flavour of the month this. Written by Brian Kernighan and Dennis Ritchie for the PDP-11, a DEC Mini. Everyone and his brother has a version of C but only three people write programs in it. The reasons are many and complex.

Originally written for the Unix enviroment, C's great strength is the power and flexibility it gives programmers. The price they pay for all that power is positively Faustian: C programs can be so concise as to be unintelligible, and often look as though they've been written in Martian. Nothing else looks like C and even C programmers don't try to read other peoples code.

There is no standard way of laying out a program and the compiler doesn't care so everyone does their own thing.

C compilers generally perform very few checks on types and none on the logic of programs: bugs can be both subtle and elusive. The program code can be nested into total incomprehensibility, and C is only one step removed from assembler.

On the plus side it gives easy access to the juicy bits of the operating system and writing in C earns a great deal of kudos with the in crowd. The code generated is *usually* fairly fast and compact. Programs can be stack bound on the Z80 chip as C passes parameters, and everything else, on the stack by default. Essential for writing operating systems.

Good C compilers are available at low cost but for serious work you need one with floating point maths. Some otherwise excellent implementations don't have this.

● ASSEMBLY LANGUAGE

Probably because, just as you used to do in assembly, you spend most of your time praying

Assembler is a low-level and simple (i.e. difficult) way of writing instructions, in contrast to the other languages here which are high-level and complex (i.e. easy).

For example, the command to make two cups of tea, one with sugar, in BASIC might be the single line MAKETEA(2,1). In assembler it would be six hundred lines of idiot level instructions such as PICK UP KETTLE and TAKE OFF LID and PUT UNDER COLD TAP and TURN ON TAP and FILL and so on. As writing all this might enable you to understand what is going on, they are encoded as 'mnemonics' (from the Greek word meaning 'something easily forgotten') thus: PUK TOL PUCT TOT FIL and so on.

Real programmers write in assembler, saying it's much faster and smoother and easier and puts you in control of what's going on. Unfortunately while moving a BASIC program from, say, a PC to an ST via a PCW and a Psion Organiser is quite possible with a few modifications, moving a program written in one machine's assembly language to another is all but impossible.

● COBOL

Common Business Oriented Language

'Common' as in 'everybody does it the same way', is almost true. It was designed a long time ago to run on mainframes where it would do relatively simple things to *very* large amounts of repetitive data. One machine running a nice big Cobol program could therefore replace a building full of clerks.

This was a Good Thing and one of the reasons IBM is the largest company in the world, all 30,000,000,000 dollars worth of it. (10 zeros, that's right.)

Cobol still constitutes 90 percent of all the program code in the world because it came first but also because it does the job.

It is not for writing games. It is a data handling language with a very precise, formal, syntax. At first glance it looks like English and once learnt is probably the easiest of code to work through.

☞

● FOCAL

Formula Calculator

A very ancient language indeed. In many user group libraries though with little documentation, so just the thing to while away the long winter evenings. Be famous and write the definitive manual to put in the public domain.

● PL/1

Programming Language / One

PL/1 was written to combine the best bits of Cobol, Pascal and Algol. IBM had a hand in it.. PL/M, its precursor, is large and expensive, the inevitable result of committee work.

Source code

A lot of the public domain languages were written in American universities as course work. It's a matter of law there that all software developed in the academic sphere is automatically public domain; a lot of skill and enthusiasm has been lavished on them and they are in no way toys even though they may lack some of the 'bells and whistles' of commercial implementations.

One of the best commercial sources of languages is Grey Matters, tel (0364) 53499. Some of the best modern implementations of languages have been written by HiSoft, tel (0525) 718181.

For the widest choice of public domain languages join a Users Group for your machine; there will be details and addresses somewhere in one of the magazines for your machine.
ther language along the lines of Forth it

● FORTH

The first three attempts failed

Taking a different approach to programming from the Algol family of languages, Forth was originally developed to control radio telescopes by Charles Moore and Elizabeth Rather. Recently it was used to program the animation sequences for *Star Wars*, (The film, not the End of the World).

Forth comes with a core dictionary of words it already understands, and new words can be constructed from these to extend the language in any direction you choose. This is called 'extending' the language. These extensions can be saved in a library and loaded with the system. Code is developed in Forth by defining new words in terms of existing ones with Forth acting as an interpreter, then the new word is compiled and saved at the top of the existing word list.

When called it calls words below it in the list. Each new defined word contains pointers to earlier words. An application consists of threaded code and runs extremely fast: Forth code can often beat an ordinary compiler.

Forth systems tend to provide complete development environments – very nice – but use Reverse Polish arithmetic. This is a stack based system common in scientific and engineering enviroments and difficult for beginners to get their minds around. (It's called Reverse Polish because the name of the Pole who invented it is unpronounceable. If he'd been called Newton he'd now be world famous – oh cruel mistress fate.)

Forth is different, powerful, and those who've mastered it become fanatics; they wouldn't be seen dead using an algebraic language like Pascal or BASIC. Be an elitist, learn Forth.

● LISP

LISt Processor (litht prothethor?)

An earlier attempt at 'logical' programming (as distinct from what? Illogical programming?) LISP, like Logo, appears to be a language that has lost its way, or perhaps it just lost me; it's certainly easy to lose your way in it.

It was written in the early 1960s as a more 'natural' approach to programming. Despite the fact that the Japanese are basing their fifth generation computer project on LISP it's hard to think of a sensible project for it; what can they be up to?

LISP is used for investigations into artificial intelligence and, like my wife, treats all data as lists. Having got a list, LISP applies goal seeking to it. LISP sounds as if it must be a Good Idea, but perhaps not on small computers.

In larger enviroments LISP can be useful. It needs a lot of data, a large TPA and a fast machine to show what it can do. Something for the elitists – those that don't want to run with the pack. If you succeed in producing any artifical intelligence send some in to go with the wooden leg.

● MODULA 2

What happened to Modula 1?

A language designed by Niklaus Wirth to replace Pascal. It furthers the structured programming concepts developed by Wirth, Dijkstra and Hoare. Extremely strong on type checking and control structures – please do not GOTO, pass GO or collect £200 – and always implemented as a compiler, there are several versions available, usually with a few extras grafted on for the convenience of non-purists.

Modula 2 produces fast code though it is very verbose at the programming stage. Highly recommended for those of you who actually want to produce something useful. But remember, there are less useful programs than you think but any number of amusing ones.

● STOIC

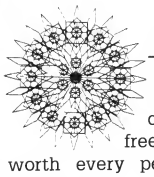
STack Oriented Interactive Compiler

This is heavyweight stuff. It can replace your whole operating system and includes an assembler and editor. Another language along the lines of Forth, it can be added to until it wouldn't recognise itself in the mirror. These extensible languages can go a long way – those of you with a yen to customize everything from your Escort to the family cat can have a lot of fun with this but extremely hairy hackers only need apply.

● PILOT

Programmed Inquiry, Learning and Teaching – yes, it should be PELOT, but it's American

This was originally designed at the San Francisco Medical School in 1973. It's said to be hot for creating dialogue between computer and user. If you're concerned with dialogue yourself you really must get a copy. Programs for interactive computer teaching of any subject are easily contructed in PILOT provided you know the subject to start with. Not for games except word puzzles.



● LOGO

Developed as part of an American university project called 'Mathland'. Given away free with the Amstrad PCWs and worth every penny paid. If Digital Research thought they could have sold a copy they would have done.

Unlike Fortran, Logo *is* suitable for writing comedy routines but the implementation on many machines isn't really all that useful for general programming projects. As for children finding it an easy route into programming my oldest has no trouble with BASIC, finds C interesting but is constantly irritated by Logo (he has to use it at school). Erase it (stands braced for indignant replies).

● PROLOG

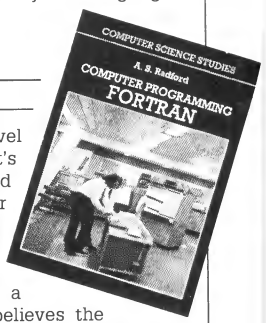
Designed in the early 1970's, Prolog is probably the best of the 'logical programming' languages. Like LISP it seeks to apply rules to bodies of data with a view to ascertaining the truth or falsehood of a statement. Prolog uses a great deal of recursion in these searches. Not a fast language by its nature but it can be persuaded to perform sophisticated functions with very little programming.

This is a language for performing tricks with data, not with hardware. Natural language is one such body of data.

● PISTOL

Portably Implemented STack Oriented Language

A Forth-type language in many public domains. You get the bones and put the flesh on yourself.: hours of fun for all the family. With a bit of effort you can end up with a completely new language.



● FORTRAN

Formula Translator

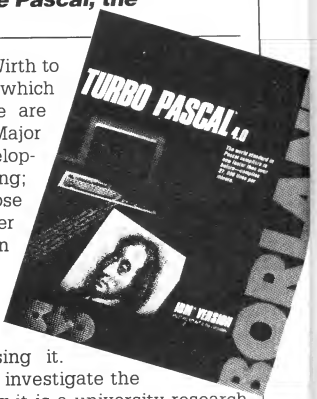
The first true high level language, written by IBM. It's the most standardised and very powerful for sheer number crunching, the purpose for which it was written. It's a language with a formal syntax and a great deal of power that believes the only proper input device is a punched card and the output device is a teletype machine (as does IBM). Fortran programs look a little like BASIC with all the string commands stripped out.

Fortran is a true compiler producing stand alone .COM or .EXE files. It offers very precise control of I/O syntax, in fact demands it. There are similarities to Algol, which is a descendant of Fortran. Fortran programs are the most portable of all, and many engineers and scientists still use it as a language of choice.

There is an anonymous quote: "I write all my critical routines in assembler and my comedy routines in Fortran."

● PASCAL

Named after Blaise Pascal, the mathematician



Designed by Niklaus Wirth to improve on Algol 60, which he also designed. We are talking here about a Major Figure In The Development Of Computing; hands up all those people who have never heard of him. Shame on you.

Pascal is highly structured and most people find it easy to develop programs using it. Originally designed to investigate the nature of programming it is a university research language that escaped.

Because it was designed before micros became common it has only limited support for interactive computing. Handling of input and output in the language as specified by Wirth presents problems when the dialogue is from the keyboard rather than to and from files. Most implementations provide non standard solutions for this as well as extensive string handling routines.

There are many good Pascals; compilers tend to produce bulky programs due to the high service overhead. Most implemetations are semi compilers.

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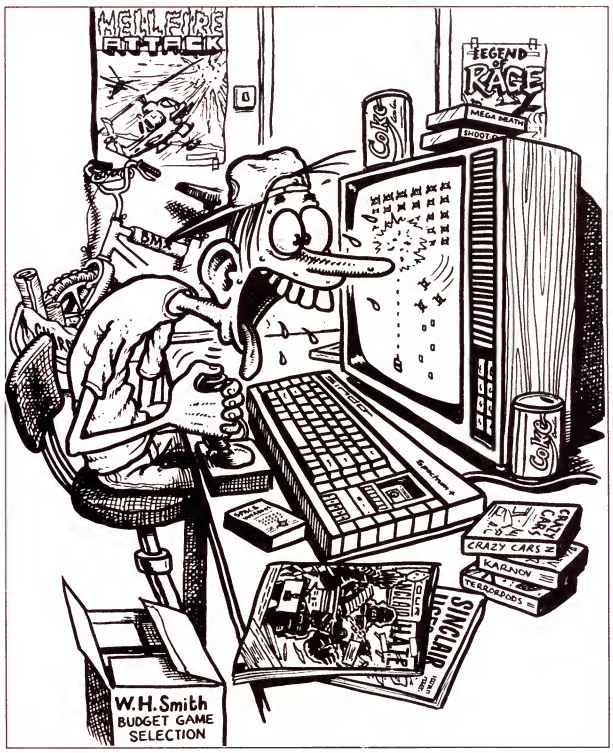
The arrival of the Spectrum heralded the start of the British mass market for colourful computer games. Five million machines could well have been sold by now, and it's still selling. Graham Kidd tells the Spectrum story...



The third computer launched by Sinclair Research could logically have been called the ZX82, but a 16K computer that offered colour and cost a mere £125 deserved a better name. To emphasise its colour capabilities, the machine was christened Spectrum, but it could very nearly have been called the BBC...

The Spectrum was intended to be an educational computer, a machine designed to teach people programming. It was, after all, a direct descendant of the ZX81, which 2,400 schools had purchased under a government scheme designed to promote the use of computers. Phase II of the government's plans invited tenders for an official computer to be supported by the BBC and used in schools. Sinclair Research made a head-to-head pitch for the lucrative BBC contract, going up against ex-Sinclair employee Chris Curry and his company Acorn. (The fact that Acorn won, indirectly led to a dust-up in a winebar where Clive Sinclair and Chris Curry resolved an argument about the merits of their machines by duelling with a rolled-up newspaper.)

Whatever worthy intentions Clive Sinclair had for his Spectrum, he was sorely disappointed by the loss of the BBC contract. When he launched his computer in 1982 Sinclair had no idea that it was going to give birth to a thriving games industry – he expected the 16K machine to be the big seller, but by the end of 1982, the 48K machines were outselling their 16K stablemates by a factor of nine to one.

The design brief given to Richard Altwasser and Stephen Vickers, the people who created the Spectrum, was dictated by the needs of the educational market – a high res display was required along with a capacity for colour. The computer was to run Sinclair BASIC, an interpreted language ideal for novice programmers – program statements are entered as keywords rather than as text, and syntax checking means that the would-be programmer simply can't enter syntactically incorrect lines. And a wonderfully detailed tutorial/manual came in the box.

Peripheral manufacturers and programmers who had started making money on the ZX bandwaggon flocked around the Spectrum, and within a few months of its launch, the programmer's machine had become a games machine – usually bought by parents who were warned off the Acorn/BBC machine by its high price, but used by fanatical games-playing children. Three dedicated Spectrum magazines sprang into being, and one of them – CRASH, given over almost exclusively to games – went on to become the country's biggest-selling computer magazine in 1986.

And it was primarily the needs of those game-players that were catered for by suppliers of software and innovative peripherals. Meanwhile, the genius for technical innovation seemed to become misdirected at Sinclair Research – as far as the Spectrum was concerned, at least. Dogged determination resulted in the eventual launch of Microdrives, and a slow response to the game potential of the Spectrum resulted in a ridiculously late joystick/cartridge interface. Sinclair Research, although they created the machine, never derived the benefit of the potential for peripherals. By the time they caught up with what was going on, an independent hardware manufacture had established a standard protocol for joysticks, adopted by most software publishers – Kempston.

A match for the game set

The success of the 48K machine, which soon became the target computer for Spectrum games programmers, meant that Sinclair's late entry into the peripherals market was doomed. Interface Two offered the facility to run software from cartridges as well as a joystick interface, while Interface I allowed an idiosyncratic tape loop system to be used as a rapid access storage medium. Both the cartridge and Microdrive ideas were bound to fail: why should a software house fiddle around with them when inexpensive audio cassettes had already been established as the medium for duplicating games?

As a result of pressure for a 'proper' keyboard, initially catered for by the independent peripheral manufacturers, Sinclair launched the Spectrum Plus. Apart from soldering one wire onto the circuit board to give a reset switch, only cosmetic changes were made. The Plus was a rubber sheep in designer clothing – little mechanical arms under the keyboard effected combination keypresses for the user, who could still only get the machine to recognise one keypress at a time. The facelift extended to the manual – out went the original 'Orange Manual' which provided many programmers with a sound grounding in their art, and in came a glossy partwork-style publication provided by Dorling Kindersley. Sinclair had finally admitted that the Spectrum was not an educational computer.

Then problems began setting in at Sinclair Research. An experiment with a USA version of the Spectrum didn't lead to volume sales – the Timex 2086, which had a proper sound chip and offered the option to have double the horizontal resolution on the screen. A version of the 2086 was apparently prototyped for the UK market, but never saw the light of day. Instead, work began on a 128K machine, but not at Chateau Sinclair. Spain was both the location of the development work and the source of funding for the 128 – and the machine was eventually launched at the Spanish equivalent of the PC(W) show.

Maybe Sinclair research was short of money by this stage, or maybe they couldn't be bothered to

The Spectrum's Family Tree

1978 MK14 launched, the first 'Sinclair' computer. Cost: £40

1980 ZX80 launched. Costs £80 as kit, £100 ready-built

1981 ZX81 launched. Costs £70

1982 Spectrum launched. Costs £125 with 16K RAM, £175 with 48K RAM. Version 1.0 sells 60,000 units, version 2.0 500,000 units

1983 Interface I, Interface II and Microdrives launched. Spectrum becomes a million-seller; prices reduced to £99.95 and £129.95 for 16K and 48K machines. V3.0 released and V3.1, V3.2, V3.3 release numbering scheme adopted

1984 Spectrum Plus released. Costs £50 more than rubber-keyed machine

1985 Rubber keyed machines and 16K Spectrums discontinued. Spectrum 128 launched in Spain. Cost:s around £180 when it arrives in the UK

1986 Sinclair Research, Spectrum stocks and Sinclair name bought by Amstrad. Cost: £5 million Amstrad launches Spectrum Plus Two – the 128K version with a tape recorder 'glued on'. Costs £140; 250,000 sold

1987 The fruits of Amstrad's redesign of the Spectrum launched as the Spectrum Plus Three. Costs £250.

1989 Two Spectrums available in the shops the Plus Two A and Plus Three, which share the same guts – £134 and £199 respectively

Spectrum Trivia

- The first 11,000 Plus Threes shipped didn't have proper sound, owing to a fault on the board.
- The 16K BASIC ROM in Sinclair Spectrums contains CAT and FORMAT commands for Microdrives and 1K of space left empty – it was allocated for Microdrive code which only arrived with the Microdrives themselves and lurked in a ROM in Interface I.
- The 48K Spectrum might be faster than you think. Benchmarks are run on the bottom 16K of memory, which runs slower than the top 32K...
- Lots of 48K Spectrums are really 80K Spectrums. To save money, rather than buy 32K chips, Sinclair used 64K chips that had failed in testing and only half-worked. Then it proved cheapest to use fully working 64K chips, but only use half...
- A Microdrive cartridge contains some 200 inches of tape in a loop. Early cartridges were made with the rough edges left by the manufacturing process on the INSIDE, where they could foul the tape.
- The Spectrum's cassette interface is probably the fastest and most reliable ever produced – data can be read in nearly twice as fast as on a BBC. It would still take some 15 minutes to load a full 128K, just one reason why 128K tape games were never likely to catch on.
- Sinclair sold some 200,000 Spectrum by mail order.

make a new casing for the Spectrum 128 – either way, it appeared in the Spectrum Plus box with a clumpy metal heatsink bolted onto the side. Sadly for programmers, the keyword entry system was abandoned and replaced with an editor, an editor which proved frustrating in use as there was no type-ahead and regular two second pauses when the machine ignored anything typed in. Software houses were hardly ecstatic about the launch of the 128, and it was never likely to catch on in the games market. The 48K user base was still massive and active, and games publishers couldn't see the point in producing large games for a small market. Most of them just wrote 48K games that played a nice tune via the 128's sound chip.

Problems continued to mount inside Sinclair Research, and eventually they sold out to Amstrad which bought the company, its stocks of hardware and the right to use the Sinclair name on computers. Rather than go back to the Spectrum Plus and redo it, Alan Sugar decided to press ahead with the 128 machines.

Maybe as a way of reducing returns caused by owners failing to align their cassette players properly, or maybe as a way of recyling huge stocks of machines returned as 'faulty', Amstrad decided to 'glue a cassette recorder on the side' of the 128 (Alan Sugar's words). The assembly went into a new casing and emerged as the Spectrum Plus Two. Amstrad also discovered it could buy joysticks for a dollar or two a unit, so they fiddled around with the pinouts on the joystick socket and bundled their own stick with the machine.

Three cheers

Finally, the Plus 3, a 128K Spectrum with 3" disc drive was launched. It was the first complete redesign of the guts of the Spectrum since 1982, undertaken primarily to get manufacturing costs down. Exactly the same internals are used today for the Plus Two (A). The Plus Three, and to some extent the Plus Twos with transplanted Plus Three organs, is incompatible with much of the add-on hardware which helped ensure the Spectrum's early success – dramatically incompatible in the case of the Plus 3. For instance, the fat DIN plug used to get power into the Plus Three means that many existing peripherals won't plug in, and the 'standard' way of doing sound for 128 impressed on developers by Sinclair as the only way to ensure upward compatibility was done away with completely.

The Spectrum is still an excellent computer, but one increasingly overshadowed by the 16-bit wonders. Developers are throwing little effort into peripherals and 'serious' software for the Spectrum, while games programmers are steadily being lured away by the innovative possibilities of the Atari and Commodore 68000 machines. The Sinclair name is still found on the Spectrum of course, and has been applied to a scuzzy PC compatible, but it no longer appears on a machine of the moment.

Ironically, one of the peripheral manufacturers that made their money during the Spectrum's heyday could be set to exploit an opportunity which Amstrad passed over. Miles Gordon Technology, the people behind the Disciple Disc Drive, are poised to launch the SAM, a computer that can run 48K Spectrum software better than the Spectrum itself and do a host of other things as well...

The computing world owes a significant debt to the Spectrum – it was and is a brilliant machine for learning BASIC. Independent suppliers supported it, generating a massive library of entertainment software and a host of peripherals that allowed users to explore serious applications and areas such as music. The Spectrum became an entertainment machine, primarily, but still fulfilled the educational needs of thousands of people.

The home computer industry owes a large debt to Clive Sinclair. ●

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Pocket Pick

Hailed as "a new category of computer" by DIP Systems' David Frodsham, the Atari Folio was launched at the recent Which Computer? *Show as the first pocket PC. Our man on the spot Matt Nicholson was one of the first to get his hands on one...*

The Folio is certainly not a portable or a laptop and clearly deserves the acronym "pocket", fitting into the industry standard with much the same ease as a well-stuffed Filofax. It looks and feels solid and relatively stylish too, particularly when opened up to reveal the keyboard and display.

DIP has clearly put some thought into the problems incurred when trying to get a full QWERTY keyboard into a space not much bigger than the palm of your hand. At first sight it looks rather like that of a latter-day Sinclair Spectrum, with the small square keys set well apart. However there the likeness ends, as the Folio keyboard has a much more positive action, giving a definite click as the key is pressed home. The key tops are slightly angled towards the front too, which helps considerably. The whole thing feels and looks well designed and well made.

Nevertheless, there is no getting away from the keyboard's size. DIP has dispensed with the function keys, supplying an [Fn] key instead which modifies the action of the number keys; and has put the cursor block in a row next to the space bar. But there is not a lot of room for your fingers and I found myself hitting the wrong key more often than not. Considering the limitations, though, DIP has done a good job and I could well believe that it gets easier with practice.

The Folio's main competition is going to be Cambridge Computer's Z88, particularly as both cost £230 including VAT, and the Z88 does have the clear advantage of a fairly conventional size keyboard. But then it is considerably bigger too, about the size of an A4 pad.

Clear view

The screen display is a Supertwist LCD that is not backlit, but seems pretty easy to read even in shadow. It is compatible with the IBM PC's MDA text mode, which is the standard text mode adopted by all PC compatibles, but only displays 40 characters by 8 lines (the Z88 offers 80 by 8 lines). This acts like a window on the PC's 80 characters by 25 lines, and the operating system provides commands for moving around the full-size screen. By default the window will follow the cursor.

The screen automatically powers down when you close the lid, and will display where you left off when you raise it again. The batteries supply power to the memory at all times, which means that you don't need to keep saving as you work. Even when changing batteries a small re-chargeable cell keeps the memory powered up. Battery life is quoted at six to eight weeks "regular use".

Storage is provided by "Memory Cards" – battery backed credit card sized slivers that plug in to a port on the left-hand side of the keyboard. These will be available storing either 32K or 128K RAM or ROM, and also provide the most handy way of moving data to and from a conventional desktop PC via a PC Card Drive; a half-height unit fitting into the space normally reserved for a second floppy disk drive. Price has not been fixed for the drive, but a 128K RAM card should cost "under £100".

There is also a non-standard input/output port, into which cables can be plugged interfacing to a printer, modem or the RS232 port of a PC for more conventional file transfer.

• The size and weight of a personal stereo: will Atari's PC start a new breed of computer?

Packed full

The Folio has 256K of ROM and "it's all full", to quote David Frodsham again. The software would appear to be comparable to the sort of desktop organiser package available for PCs these days, with text processor, spreadsheet, diary, calendar, calculator, card index and file transfer. All share a common menu system and all seemed fairly friendly on first appearances.

All packages produce straight ASCII files, which means transferring data to and from a host PC application should be straightforward (unless you happen to use *WordStar* of course). The spreadsheet reads and writes *Lotus 1-2-3* files (version 1 and 2.01), offers 127 columns by 225 rows and "all non-database and non-graphic functions". A particularly innovative feature is the phone book, which can actually tone-dial the phone numbers if you hold the phone up to the small built-in speaker – unfortunately not much use with our pulse dialling system.

Tech spec

Hardware:

- 16/8 bit 8088 CMOS processor, running at just under 5MHz
- 128K RAM (expandable)
- 256K ROM holding MS-DOS 2.11 equivalent operating system and applications
- 40x8 character, 240x64 pixel MDA compatible Supertwist LCD screen
- 63 key QWERTY keyboard
- 60-pin expansion port
- 1x Memory Card port
- 3x AA battery power supply giving 6-8 weeks normal use
- Measures 200x100x28mm
- Weighs 450 grams (1lb)

Peripherals:

- 32K and 128K RAM or ROM Memory Cards
- Half-height Memory Card drive for conventional PC
- Smart Cable for RS232 and Centronics link

ROM Software:

- *Lotus 1-2-3* version 1 and 2.01 compatible spreadsheet with 127 columns by 225 rows
- Calendar and diary up to year 2049
- Card index address and phone book with tone dialler
- ASCII text processor
- Memory calculator
- File transfer via Smart Cable

The underlying operating system is compatible with MS-DOS 2.11 and should be able to run reasonably well behaved text-only MS-DOS applications – provided they can fit into the 128K of RAM. This, combined with its small size, gives it quite an advantage over the Z88 – particularly as the latter can only offer 20K of free RAM.

The Folio was developed by Distributed Information Processing (DIP) Limited which specialises in developing hand-held systems for larger corporations. The technology represented by the Pocket PC has been licensed to the Atari Corporation for the Atari Folio, although DIP will continue to supply the Pocket PC for specialist applications.

Sales were put at over 500,000 by the end of the year, and DIP was confidently predicting shortages in the first few months. Certainly anyone who uses a PC at work and would like to continue while out of the office will be considering one of these seriously. ●

Coming to a shop near you...

The Pocket PC should be available in your High Street shops from the middle of summer for two hundred pounds or so. When the production version comes out *Express* will be giving it a full review.

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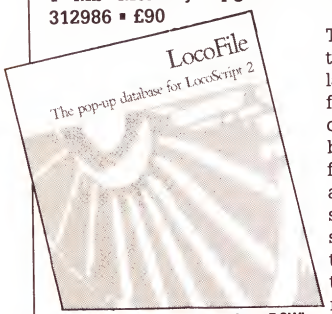

• LocoFile stretches the PCW's memory – but you can get round it now...

The problem with the increasingly large *LocoScript* family of spell checkers, databases, printer fonts and so on – apart from lack of space in your study to take all those discs – is that you begin to run out of memory pretty quickly if you want to use them all. All the printer fonts, dictionaries and so on are copied to M automatically when you start up, and you can end up with just a handful of K free in drive M, resulting in absurd situations when trying to copy a disc which advise you that 38 changes of disc will be needed for this operation. The 8256's memory seems positively minuscule – Locomotive now recommends *LocoScript 2* as the standard and a memory upgrade to 512K for 8256 owners.

Hence the need in some users' minds for a one meg PCW. Isenstein (maker of a portable PCW, repackaged in a suitcase-sized metal box) has just started supplying its memory upgrade which enables you to add 512K to your 8512 or 8256.

For your money you get a memory board to replace your old one. Either you can send your old board in and wait for the replacement in the post, or you can order the replacement first on payment of an additional deposit of £70. The operation is simple and only involves unscrewing the case at the back of the machine and unplugging, or connecting, three plugs into the memory board. Instructions are supplied and the whole operation takes about twenty minutes. The most involved skill needed is using a screwdriver.

Once that's done, booting up *LocoScript* reveals 880K in drive M – more than enough for the biggest user dictionary imaginable, the database and all your data files, printer fonts galore, and more. It doesn't work with *LocoScript 1*, but then the add-ons only work with version 2 anyway.

CP/M recognises the expanded memory too; you can now run *Protext* with enormous dictionaries in M, and copy your database program and all the files, BASIC, and a few games over too.

One major advantage of the big memory is having the space available to copy B discs in one operation: B number 1 to M, M to B number 2. For making backups of data discs this is a godsend. The upgrade works on 8256s, using a special switch on the supplied board, giving you 630K in drive M, though it's not really recommended: you're better off having a standard memory upgrade first to 512K (it costs about £20) and then fitting the extra 512K.

For DIY enthusiasts there will be a kit available shortly enabling you to convert the memory board yourself, for a few pounds less than the ready made board.

Is it worth it?

Do you need the memory? Well, if you do a lot of copying of whole B discs, use all the *LocoScript* family at the same time (*LocoSpell*, *LocoMail*, *LocoFont* and *LocoFile*) or just want plenty of memory to let all your CP/M programs sit in permanently, you will be interested.

If you have, or are thinking of getting, *LocoFile* to run with your *LocoScript 2* you'll find it very useful. You can run even your large data files in memory making access and saving time much quicker (and then save it before switching off, of course!). *LocoFile* can handle files of unlimited size, so that 500K customer list can be copied from the B disc at startup, worked on in memory during the day, and saved at the end.

If you use lots of CP/M applications – say, *Protext*, a couple of large dictionaries for the spell checker, BASIC plus a few listings, a couple of games, a spreadsheet and a database plus the data files and your utilities like PIP and SID – you can have them all copied to the memory at startup and have them all working instantly from M, always available, without having to insert discs. And still have space for disc copying.

The TPA (the working space of a program) cannot be altered, so you still can only work on *SuperCalc* files or BASIC listings of 30K or so, extra memory or no.

This is of interest to the maker of *Flipper*, the program which splits the PCW memory into two enabling you to run two separate CP/M programs (or CP/M and *LocoScript 2*) simultaneously and flip from one to the other, resuming where you left off. It is working on a new version that uses the extra memory to run two complete 512K PCW environments simultaneously – that means *LocoScript* and *LocoSpell*/*LocoFont* etc in one half, and even a large CP/M program like *Stop Press* in the other. It must be a few months away yet though.

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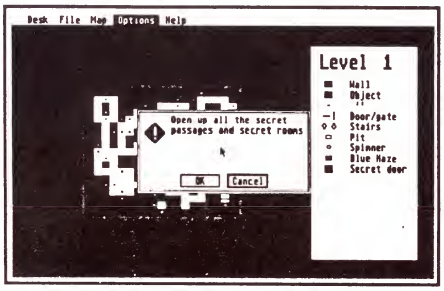

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The Great Freescape

You've played *Driller*, of course. You haven't? Where have you been living, what did you buy your ST for in the first place? *Driller*'s the release with which Incentive Software launched its *Freescape* 3D landscaping technique to produce a game that's highly addictive. I loaded it up again today for the first time in a while and it was a case of "Ye Gods, what happened to the last hour?"

Driller was followed by *Dark Side*, and that's been out on the 8-bit machines for several months, so long in fact that the third *Freescape* game, *Total Eclipse*, has now also been published – and is picking up the proverbial rave reviews.

So where are the ST versions? To find out, I grabbed Incentive's supremo Ian Andrew by the lapels. And that's not easy over the telephone.

"The ST version of *Dark Side* is only a few weeks away now," he told me. "It should be out by about the end of March, with *Total Eclipse* also out very shortly afterwards. We've been developing both games at the same time for the ST. They'll obviously be much better than the 8-bit versions – we don't believe in just doing a straight conversion job. One thing they'll both have that's a step on from *Driller* is animation. In *Dark Side* there'll be various flying creatures whizzing around, and there won't be just static objects firing at you, they'll be chasing after you. In *Total Eclipse*, which takes place inside a pyramid complex, we've animated the mummies, for example. We did produce playing hints for the 8-bit versions, but there'll have to be new ones for the ST as there's so much more going on."

And the price we'll be expected to pay for the privilege of being chased around the screen by mobile mummies? "We haven't even decided that yet. I'll let you know as soon as we do."

STACs of adventures

Letting go of Ian Andrews' lapels (well, it had been bringing tears to the poor chap's eyes), I also took the chance to ask him if Incentive would be publishing any adventures written on its *STA C* adventure-writing system.

"Not yet, though we'd still like to. We've been sent quite a few, and the numbers are increasing as I think it's taken people quite a while to start to get to grips with *STAC*. It's a much more complex program than say *GAC* or *PAW*. Some of the adventures we've been sent would make good budget titles, but we don't publish budget games and we've passed these on to budget houses, so I'm hoping some of them will see the light of day. They certainly deserve to be published. But what we want is an adventure that's good enough to warrant a full-price release, and one or two have come close but we haven't yet seen anything that's got that extra something."

So is it really worth *Club ST* readers sending in their adventures? "Oh yes, by all means. I'm sure we'll soon get the kind of adventure we're looking for, and that we'd be delighted to publish."

So get *STAC*ing, folks, and send the results to Ian Andrew, Incentive Software, Zephyr One, Calleva Park, Aldermaston, Berks RG7 4QW. Just don't forget my introductory commission, will you?

Database dates

A date for your diaries... that's standard journalistic introduction number 186, in case you didn't spot it... is 23rd June, when the Umpmteenth Atari Show opens for three days at the Ally Pally. This replaces the show originally scheduled for April, which had to be cancelled because... but my lips are sealed on that one, but though the name A**** is not unconnected.

Database Exhibi-tions has unleashed a set of fascinating facts for the June show, among them being that the pro-jected attendance is 12,000 and there'll be 2,780 square metres of floor space. This means that if every-one turns up at the same time there'll be four people packed in-to every square yard. This seems about right for the average computer show, so to be on the safe side I'd place your drinks order now with organiser Andrew Godsall on 0625 878888. Mine's a pint of beaujolais.

A parakeet replies

In his QL column the other week, Eric Simmonds said that if he wanted a multicoloured noisemaker he'd buy an ST – or a parakeet. Very droll. Now go away and write an ST emulator that'll run on the QL.

Fishface

If, like me, you're averse to using your original disks, but the wretched thing is so well-protected that you can't back it up, here's a tip for using Romantic Robot's Multiface with the Magnetic Scrolls adventure *Fish*. This is especially resistant to copying, and Multiface can't cope with the full program as this only 'freezes' what's in memory at one time and the program constantly accesses the disk for those wondrous graphics. So if you type GRAPHICS OFF before saving through Multiface, you can produce a text-only backup version for playing, and save the original for when you want to see the pretty pictures.

Another tip in that game can be used if you don't object to taking advantage of bugs in the program. If you're in the Smithy but can't see the gloves, type GET GLOVES and voila! – "You have now got the asbestos gloves." The fact that you can't see them may be a bug anyway, so don't sit there debating the morality of it, just get the gloves!

Mike Gerrard

• Driller on the ST – but when are Dark Side and Total Eclipse coming out on our favourite machine?

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PC UPDATE

Shopping around

Those in the market for a laptop PC should ring 0792 796000 and ask around. That's the number of Comcen, one of the first importers of things Taiwanese and a budget supplier since 1977, a fair while in this business.

Its latest catalogue details a laptop PC, the LX-10, with a spec that knocks spots of most laptops at under £1,000. It's a true laptop, not one of those that looks like a fat ghetto-blaster and needs a very long trailing lead if you want to use it on the train.

The screen is a super-twist LCD, which should be OK, though I haven't seen it yet. The processor is an NEC V20, just cleared of a copyright infringement of the Intel 8088 in an American court ruling, and giving 10% better performance than the US chip. It runs at 4.77MHz or a nippy (no pun intended) 10MHz and has a full complement of 640K on board. Also tucked into the case are two 750K 3.5" drives and a rechargeable battery which Comcen quite honestly says runs "for a few hours" away from a mains supply.

Socketry includes serial and parallel ports, and connectors for an external hard disk and CGA standard colour monitor. It comes complete with MSDOS 3.3 and *GW BASIC* (does anyone actually *use GW BASIC*?) and costs £599 plus VAT. You can also claim a 10% discount if you're a member of the IBM PC User Group. There's an AT version of the laptop with a 20Mb hard disk, and a gas plasma display option for both machines.

BASIC wins through

Microsoft, purveyor of all things Quick (*Quick BASIC*, *Quick C*, etc) have apparently decided to recommend software houses to use BASIC for the fancy bits of *Presentation Manager* applications. *PM* is their Windows-like front end for the World's PS/2 machines. This decision is something of a victory for hard-line BASIC programmers, who will GOTO any lengths to persuade other programmers of its virtues.

It has to be said that *QuickBASIC* is an excellent implementation of the language, with good string and array handling and a fast compiler. Best of all, you can normally pick up a copy for around £60. It's a pity Microsoft didn't use *QuickBASIC* for its own *PM* development – it might have been a bit quicker coming.

Simple copy

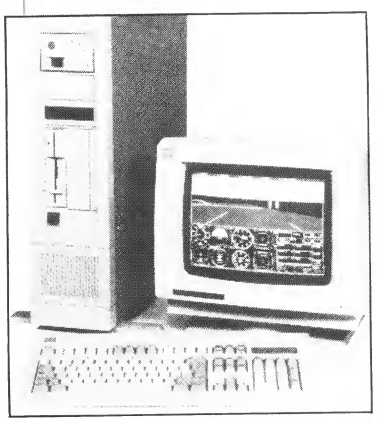
A tippette on MS-DOS 3.3 (it may work in other versions, too), concerning the COPY command. If you want to move the complete contents of a sub-directory into the current directory, even from one drive to another, you only have to name the sub-directory in the COPY command, like this:

COPY C:\WP\LETTERS

This command copies all the files in the LETTERS sub-directory of the WP sub-directory of your C drive into the current directory. It's no big deal, as it only saves you an extra *.* on the end of the command, but it all lends that little bit towards extra productivity.

Two heads are better than one

So, having rejected Morgan as the source of my new 386 (journos read reviews in *PCW*, too, you know), and earlier Wells American, I've been through a goodly number of possibles in the last week. These include Dell, Kaypro, Hewlett Packard, CompuAdd and Elonex, all of which had good machines but not with the spec I want at the price I can afford.



• The RSC Tower 386 – a possible best buy

On top of this, well-meaning friends keep coming up with suggestions for the spec, the latest of which is "I'd rather have a 16MHz machine with a maths co-processor than a 20MHz machine without". The reasoning behind his argument, which is relevant to anyone wanting the power of this type of machine for graphics applications (CAD, DTP, presentations), is that a co-processor can speed up the maths involved in graphics by a factor of 10. The speed increase involved in a 16-20MHz upgrade can only be in the order of 25%, though this does apply to all operations.

If you're considering a co-processor, you do have to be certain that the applications you'll be using know how to use a maths chip. Most modern graphics applications switch automatically from their own software routines to those of the co-processor when they detect its presence. This said, the prospects of trying out the latest Ventura or AutoCAD clone on a machine with an 80387 fitted look extremely inviting.

386s I'm now looking at include those from RSC, Advent, CAS Computers and Watford Electronics – I'll let you know how I get on.

Olivetti slips one in

Having made all sorts of rude noises about the Microchannel Architecture when IBM announced it last year, Olivetti has finally come round to the 'right' way of thinking by announcing an MCA-based PC for release very soon. As one of the main participants in the EISA conglomerate, it could be said that Olivetti is keeping all its options open, and has promised another 'major announcement' towards the end of the year.

Fax facts

If you are considering getting a Fax machine or a Fax card for your PC, but are worried by the cost of another telephone line, consider the following, put to me by Tim Kay of Silicon Systems. Buy a splitter box for your current BT line, connect your audio phone to one outlet and the Fax machine/card to the other.

When a call comes in, your phone will ring. Lift the receiver. If you hear a carrier tone, you can assume the incoming call is a Fax and replace the receiver to let the data through to your machine/card. If there's no carrier, offer your number in the normal way. Not very elegant perhaps, but quite practical.

Simon Williams

AMIGA BLIT

Amiga PRO-24 at last!

Activision's *MusicX* MIDI sequencer for the Amiga has been causing quite a stir in Amiga land within the last few months. Talk to an Amiga musician, and sooner or later the conversation will undoubtedly turn to *MusicX*. It seems that although the product has been heavily delayed, Activision has a guaranteed winner... or does it?

News reached my ears this week that may see staff at Activision getting very worried indeed. In fact, if they've any sense at all, they'll be quaking in their boots. "Surely nothing can stop *MusicX* cleaning up the market place?" I hear you cry. But no, think again Amiga user, for Steinberg's *PRO-24* is almost here!

Anyone who has had even the slightest exposure to MIDI sequencing on the Atari ST will instantly recognise the name of Steinberg and, more specifically, *PRO-24*. *PRO-24* has virtually become the music industry's standard computer-based MIDI sequencer. Top musicians such as Midge Ure of Ultravox swear by the product, and use it heavily within the production of all material. As many will confirm, *PRO-24* can probably be credited with being the one piece of software that got the Atari ST where it is today within the music industry; These days, Atari STs sitting next to Series III Fairlights is quite a common sight!

Amiga *PRO-24* was demoed at a music fair in Frankfurt in January to a select few who are close to Steinberg, and from what I can gather, the Amiga version looks set to be just a good, if not better than its Atari predecessor. The British distributor of all Steinberg products, EvenLode Soundworks, claims that the product will most likely retail for £250 inc VAT, and should hopefully be available in about a month – which, once translated, means a couple of months.

Why Steinberg, a company that has been publicly saying for years that it has no intention of writing for the Amiga, has seen fit to totally change its view of the machine is unclear. Some industry observers believe that because Steinberg is a German company, the Amiga's vast superiority over the Atari in that country forced them to rethink their position.

Where, then, does this leave *MusicX*? Well, put quite simply, unless Activision gets *MusicX* out onto the market within the next week or so, it could find itself stuck with a product that nobody actually wants. The Amiga conversion of *PRO-24* will almost definitely sell on the name alone – which would you choose, the industry standard as used by top musicians or a product that has never been used before in a live situation?

Its quite a shame, as *MusicX* stands up well against *PRO-24*, but a good reputation on another machine can do wonders for a company and its products. Mark my words, *PRO-24* will become *the* Amiga MIDI sequencer. EvenLode SoundWorks can be reached on 0993 89228.

Lattice C: back at number 1

Probably one of the most interesting releases of 1989 for me is that of *Lattice C* version 5. As anyone who knows me will confirm, I'm a self-confessed C addict, and ever since my early days of programming on a Unix System V, C has become my number one choice for programming. Some call it unreadable, others say it's confusing but I just can't get enough of it!

Lattice has always been one of the leading forces in the Amiga software development tools market; even the original Commodore Amiga C compiler issued to software developers was in actual fact a Lattice product! With the recent release of an updated version of *Manx Aztec C*, which included their powerful SDB debugger, Lattice's monopoly on the Amiga market seemed under threat. This latest release, however, looks set to put Lattice firmly back on the throne.

The most major changes in version 5 of *Lattice C* is the inclusion of the *Lattice Screen Editor* (*LSE*), a powerful text editor that even allows to compile your program from within the editor. This one-step approach will be familiar to anyone used to using compilers such as *Borland Turbo C* on the PC. The other major addition is the Lattice debugger, *CodePRobe* (*CPR*). Looking and performing remarkably similar to *Manx's SDB* debugger, *CodePRobe* allows you to single step through your program and see at a glance the effect on the machine as each statement is executed.

Lattice C version 5 retails at £241.50 from MetaComco, author of AmigaDOS (but don't hold that against it!). MetaComco can be reached on 0272 428781.

Jason Holborn

Cheats and Tips Galore!

After having a bit of a rest, the AmigaBLIT games section is back with more tips and cheats than ever before. Is cheating immoral? or course not! If the fate of all humanity is at stake, no ones going to worry about a little bit of clever deception are they!

• Double Dragon: Fancy being able to kill your opponent on the spot with just a single key stroke? If so, just type R U CALLING MY PINT A POFF? and press RETURN. During the game, pressing [DEL] will instantly kill your opponent.

• Wizball: Pause the game and then type in RAINBOW. When your restart the game, pressing [C] will fill the cauldron, [S] will take you onto the next level and [T] will let you complete the entire game.

• Nebulus: On the title screen, type in HELLOIAMJMP (don't include spaces). You can now change levels by pressing [F1] through to [F8]. You also gain unlimited Pogos!

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SPEX

Coming attractions

With the dark, forbidding shadow of 16-bit looming over us, you might expect the number of quality software releases for the Speccy to decline. Well think again! I've put some new batteries in my crystal ball, had a quick peek into it and can confirm some jolly interesting releases.

The best way to simulate flight on a Spectrum? "Throw it out the window" some might say, or at least they would if it hadn't been for that little accident which occurred shortly after their last Spectrumist comment. Anyone who's played one of Digital Integration's simulations knows better. Past titles like *ATF*, *Fighter Pilot* and *Bobsleigh* rank as some of my all-time favourite games. Latest Speccy emission from the firm should be *F-16 Combat Pilot*. It's been developed in close conjunction with real-life F-16 pilots, and could well be one of the most realistic flight sims to date. It could be just the thing to overcome that huge inferiority complex you've been suffering from since seeing *Falcon* on the ST.

• F-19 Stealth Fighter: coming soon from Microprose

Other flight simulators approaching at Mach 3 are *F-19 Stealth Fighter* from Microprose and *Chuck Yeager's Advanced Flight Trainer*. Very pleasing to see such highbrow and respected games make it onto our small (but perfectly formed) friend.

French software house Infogrames has two potentially superb products ready to be unleashed on the market. Both *Captain Blood* and *Purple Saturn Day* have been very well received by the press in their 16-bit lives (10th and 7th in *Express*'s Greats of '88 list). The former's an exploration-type game with pretty graphics and Jean Michel Jarre soundtrack, and the latter is a souped-up *It's a Knockout* played on Saturn.

Blasteroids is a conversion of the Atari coin-op which, by my reckoning, owes me at least a tenner after all those ten pences I poured into it. The Spectrum version is nearing completion and looks excellent – and if the original's playability has been captured it'll be well worth purchasing.

Abstract Concepts, the firm set up by Fergus McNeill for serious adventure releases, should have its second game – *Parisian Nights* – out soon. This is a spy thriller based around the exploits of a French detective. The humorous side of Fergus and pals should be seen again soon in a new Delta 4 mickey-take. 'Must buys' for adventurers, these two.

Eager Disciples

It's good to see hard core enthusiastic support still exists for the range of Speccy disk systems. They might be getting on a bit now, but a lot of people out there are still using them in preference to the +3.

I've already told you about *Outlet* back in issue 9, which covered practically every species and humble tape-based people as well. Now postie had dropped *Format!* through my letterbox, which is a publication aimed squarely at +D and Disciple owners – although strangely enough it actually comes on a cassette, apparently for easy transfer to disk.

The asking price of £1 gets you a fairly interesting mix of articles land chat, along with some useful-sounding disk utilities – there were a RAMdisk and a program to bring erased files back into life in the issues I saw.

The editor, Barry Turner, also runs *Netlist*, a directory of like-minded Disciple/+D users you can get in touch with. Obviously an ambitious chap, as according to one article he uses his Speccy to control astronomical equipment. Impressive, eh? To get your hands on the latest issue of *Format!* send £1 to **47 Jubilee Crescent, Gravesend, Kent DA12 4JG**.

Other fanzine and user groups eds; send your latest issue for evaluation and a free plug to **SPEX, New Computer Express, 4 Queen Street, Bath BA1 1EJ**. Please specify sink or bath.

Savage Ninjanoid II tips

What would you do without me? Yet again, astride my white charger, sword in hand, I ride to your rescue for a whole host of games. Well, three, anyway.

Savage: I already told you the password for Level Two (Sabatta) way, way back in the early existence of *Express*. Just to show you I did reach the last stage, the password for it is FERGUS. And there's more – hold down keys F, E, R, G, U, S on Level One for infinite lives. Now all I want to know is who the heck Fergus is?

Last Ninja II: To prevent yourself being beaten to a pulp, hold down the PAUSE key (H, I think) and watch the baddies' energy go down.

Arkanoid II: First get a High Score and enter your name as MAAAAH. This activates the cheat mode, and allows you to start on the last level you went to.

Robin Alway

Return of post

It's said that some of the most stressful times in the average human lifetime occur when moving house or starting a new job. For this columnist, it's buying goods mail-order. I can't think of a more frustrating pastime (apart from watching Give us a Clue, maybe).

Imagine the state of shock I was in then when one mail-order outfit sent my order by return of post and in perfect condition as well! Such service really does deserve a mention. Not only that, but Lion Computers of Merseyside seems to be one of the few retailers which stock serious Spectrum software and hardware in any quantity. This can be hard to get hold of, as the major chains will only put games on their shelves. For the latest price list, phone 051 608 0435.

SECTOR 64 SECTOR

Coming soon

Legend of Black Storm ▪ US Gold ▪ Should be out as you read this
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If you don't remember Braybrook's little gem, then go and get it. Gribbly is a cute little character seeking pancakes with eyes – but don't get the wrong idea, as it's all very good fun.

Demo offer

If you're looking for some good demos on either the 64 or the Amiga, then send £3.00 for a year's membership and free demo disk to **Wicked P.D., Unit 27, 33 Noble Square, Basildon, Essex SS13 1LT**. This also includes catalogues for the specified machines.

Violence in games

Are you the sort of person who gets offended by computer games? Recently, there's been a lot of feedback over games like *Psycho Pigs UXB*, and not so long ago the *Dracula* game from CRL. Do you think it's going just a little to far when people moan over pixels on *Dracula*? Because that's all they are.

Similarly, I doubt that games like *Operation Wolf* would influence a massacre, so why should be even think about putting age tags on computer software? To be perfectly honest, as soon as someone puts an "18" tag on a game for either violence or nudity, people are going to rush out and buy it just out of curiosity. The game is going to end up selling more units than if it had a "PG" tag on it.

Also, why is it that people in the UK get so offended about these things, when in other European countries, attitudes – specifically towards nudity – are so much more relaxed?

Just who is it that gets offended?

• Free budget games at Boots? One minor catch, of course... See *Boots bargain*

Boots bargain

Boots is giving away a budget game with every full-price purchase, you'll be pleased to hear. You'll have to get your skates on, though, because the offer finishes at the end of next week.

Thanks

To all those people who have written in to *Sector 64*. Now that we've had a good response, we'll try to respond to all requests on a weekly basis.

Jolly Roger

C64 owners can hardly have failed to notice all the fuss over Buena Vista's *Who Framed Roger Rabbit* game. As the *Express* review revealed, the gameplay might not be up to much, but the graphics are superb.

Well, just to show the C64's no slouch in the graphics department either, here's a screen shot from the 64 version.

Ian + Mic

Listing

This week's listing is set out slightly differently, to help those people just starting out in machine code. First of all, the listing in BASIC loader form:

```
10  FORL=0TO33:READA:POKE 49152+L,A:NEXTL
20  DATA 120,169,192,141,21,03,169,13,141
30  DATA 20,03,88,96,238,32,208,169,01
40  DATA 141,25,208,169,127,141,13,220
50  DATA 169,129,141,26,208,76,49,234
60  SYS49152
```

Now, this is how the program looks in machine code:

```
0C000 78      SEI       ;stop interrupts
0C001 A9 13   LDA #$C0  ;high byte memory address =$C0
0C003 8D 15 03 STA $315 ;high byte pointer for irq
0C006 A9 0D   LDA #$0D  ;low byte memory address =$0D
0C008 8D 14 03 STA $314 ;low byte pointer for irq
0C00B 58      CLI       ;start interrupts but this time with new pointers
0C00C 60      RTS       ;returns,in this case it returns to basic
0C00D EE 20 D0 INC $D020 ;irq points here $C00D,this line adds to the border
0C010 A9 01   LDA #$01  ;loads accumulator with #$1
0C012 8D 19 D0 STA $D019 ;stores accumulator in $D019
0C015 A9 7F   LDA #$7F  ;
0C017 8D 0D DC STA $DC0D ;these are timers for the irq
0C01A A9 81   LDA #$81  ;
0C01C 8D 1A D0 STA $D01A ;
0C01F 4C 31 EA JMP $EA31 ;this returns to the basic editor as normal
```

Once every fiftieth of a second the computer points to location $314-$315, and whatever is stored in there the computer will jump to. All we have done is put the high and low byte numbers of the location in $314 and $315, so the computer goes to our routine every fiftietch of a second. So that the computer can carry on as normal, we jump to $EA31 at the end of the interrupt. This is done to allow the basic editor to carry on as before. The timers are important, as they make the interrupt run on time.

In this case we have our border flash routine at location $C00D, so we split up this big 16-bit number into two 8-bit numbers – $C0 and $0D. We put $C0 into $315 and $0D into $314. The computer now knows where to go, and will run whatever's there.

This listing is only small, so why not experiment with it?

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PCW PATCH

Sounds of diskord

And just why are three-inch disks so expensive? It seems to be favourite question of the moment so why not ask it here too? Unfortunately the truth will not set you free.

Think about it. You are a far Eastern manufacturer of a product that only one company supports – got that? Perhaps you are also a British company that quite rightly would like to make large profits from consumables on machines that effectively sell only once to each customer.

While I wouldn't suggest collusion for a second, it seems to me that self interest is best served by ensuring that the British company is allowed to buy up the majority of three-inch discs at a nice high price and sell them on at an absolutely extortionate price (thus maintaining the price structure) for as long as the market will bear it.

Three-inch discs are only slightly more complex than the three and half-inch variety (take them apart and have a look) and certainly can't cost three times as much to make; and as for the plastic case – who needs it?

Flipping heck!

The strange and wonderful Flipper from Software Imperative has undergone an upgrade – it happens to the best of software – and now costs £29.95 (upgrades are available from Imperative for £5 plus the original). It now works with Mini Office as well as with the latest upgrade to Locomotive's LocoScript.

This news came as something of a surprise to Richard Clayton of that illustrious company who was under the impression that they'd cured the 'bug' that allows Flipper to do its dastardly deeds.

This column is assured that they will get it next time. Wonderful news, this, since it means that version 2.2 of LocoScript is not to be the final one. Expect even more improvements to the LocoScript enviroment (as it now is).

In practical terms, Amstrad is the only company which uses the three-inch format and easily the biggest buyer in the market place. It is a small step from being the biggest buyer to being the only buyer.

Squire Gannetripple's database

Why would PBM'ers need a computer? Play by Mail is of necessity not a high speed occupation and yet even in an enviroment that moves at a mail's pace computers have their uses.

Role-playing gamesters need to keep track of a terrific amount of information, which is all constantly changing. How strong is Cleftskull, who follows Lord Gaunt, which spells now affect Daemonspoor? This sort of stuff is what databases were invented for, and how much more exciting to have complete exotic worlds hidden behind that bland green screen than to use the PCW for keeping track of your foreign coin collection.

Steve Patient

QL corner

Quanta workshop

Quanta, the QL users' group, is holding a weekend workshop in Northampton on the 18th and 19th of March at the Kingsthorpe Community Centre. If you don't already belong to *Quanta* and you'd like to see what we get up to, come along – you'll be very welcome. Further details from Phil Borman on 0472 49850.

BASIC to C translator

Chas (The Editor) Dillon has written a program that translates *SuperBASIC* programs into *Lattice C* for compilation on the QL, or any other machine that has a compatible C compiler (the PC, Amiga and ST, amongst others).

The translator was written in *SuperBASIC*, and *Turbo*-ed. Chas is hoping to get it to translate itself shortly – the ultimate test for this type of program. It will be available from PDQL.

Another DOS emulator

Digital Precision is about to release its DOS Emulator. Judging by the adverts, it offers much more than the ANT emulator that Eric Simmonds has already cast a critical eye over.

A thought just struck me. One can get a public domain CP/M emulator that runs on PCs under DOS. How about running this on the QL running the DOS emulator – an emulator running an emulator?

DIY keyboard fix

Probably the commonest fault on the QL (especially if it is getting a bit long in the tooth) is a faulty keyboard membrane, resulting in several keys not working. It is quite easy to fix this yourself – you only need a membrane (£5 or less) and a screwdriver.

QL hard disk

Stewart Honeyball of Miracle Systems tells me the company is getting on quite well with its hard disk for the QL. To keep the cost down, it is using a standard PC-type interface card, with some additional circuitry to connect it to the cartridge port, leaving the expansion connector free for expansion memory and a floppy disk interface.

Not to be outdone, Quanta member Dave Richards is using a home-brew hard disk system based on the Inmos M212 disk controller transputer, with a second-hand hard disk that cost him £20. It should be on display at the Northampton meeting mentioned above.

Once you get the QL apart (don't touch the screws between the Microdrives) it is fairly obvious how to replace the membrane. Do remember to make a note of the connections between the indicator LEDs and the main circuit board before you disconnect them.

With QL repairs costing around £25 no matter what's wrong, you haven't really got anything to lose. Even if you cock it up you can't do much damage.

John Torofex

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Financial education

I recently had the good fortune to attend the opening of a new Information Technology room at one of our local schools. As usual at these affairs, a dignitary was on hand to make a speech, but in this case it was the local MP, Dr Brian Mawhinney, who is also a Government minister.

His speech was remarkable for the fact that it touched on one of the Government's more controversial policies; that of Local Financial Management, whereby individual schools control their own affairs.

I am not going to comment on the wider implications of this policy, but I would say in this context it has been a success. Certainly, the rows of gleaming Master and Archimedes computers all networked together were a sight for sore eyes.

Later, the teacher in charge of Media Studies was more forthcoming about the project. He informed me, for example, that the policy of the LEA was to recommend the use of Acorn computers in all local schools. Masters for the primary schools, and Archimedes for the secondaries.

This is typical, and is further evidence that BBC computers will be around for the forseeable future.

It is also evidence of the achievements that can be attained when both Local Authority and school pull together. In this case, a cheque for £500 was donated by the PTA to mark the event. He also told me that the intention of the school was to put a networked computer at every site, and also to pursue a policy of integrating the hardware into the everyday life of the school.

Sound idea

Audiocalc is a new spreadsheet for the BBC micro – with a difference. It talks! The program is intended for use by blind and partially sighted users, and can work with a number of different speech units, such as those by Acorn (speech chip), Microvox, Votrax or Braid. The program was developed at Sheffield City Polytechnic, and is being distributed by St Dunstans, a nationwide organisation for people blinded in the services.

Right on cue

To pass onto lighter matters, I have a press release in front of me which gives the release date of Firebird's *3D Pool* simulation. The game will be available from the 18th of April and will feature 'Maltese' Joe Barbara both in the game and on the packaging.

Extra *Help

*Help is possibly the most used command on any BBC micro, but did you know that adding a full stop at the end will generate an expanded listing of all currently-available commands? Don't be surprised though if it won't list ALL your ROMS. I tried it out and it seemed to work better on a Master than on a standard model B.

Andrew Brown

MSX TRA

New games

Galaga ▪ Bug Byte ▪ £1.99

Another of Bug Byte's Arcade Classics series, this is a vertically-scrolling shoot-em-up with a 3D star field as a backdrop. Alien ships race in from various directions and form ranks across the screen in front of your ship. You – naturally - have to blast them out of the sky.

The sprites are well-drawn and colourful, and the music and sound effects are very good. In fact, this game looks and plays like a full-price Japanese game from a couple of years ago. Sprite movement and scrolling is first class. Highly recommended.

Pasteman Pat ▪ Silverbird ▪ £1.99

Whereas *Galaga* is pure reflex, *Pasteman Pat* needs quick thinking and a mind that likes solving puzzles. You control Pat, the local poster-putter-upper. Someone has been messing up his posters, and you have to help him slide the pieces back into place in a given time.

Sounds easy, doesn't it? Well maybe to some people it is, but I'm not one who enjoys sliding puzzle games, even though this one is extremely well done.

There are five pictures on the tape to choose from, and they are all very well drawn. *Pasteman Pat* is also well-defined, and I could not fault the programming at all.

What's new?

It's strange, isn't it, that the computer currently being hailed as a potential winner has specifications almost identical to a three-year-old MSX?

The computer I'm talking about is the SAM from MGT. The specifications read as follows: Z80B processor; 33K ROM; 256K RAM; 3.5" disk drive; 64 colours and four screen modes; highest res 512x196.

Now read the specifications of the JVC HC-95 MSX 2. It has a Z80A chip running at 3.5MHz and a JVC HD64180 processor running at 6MHz, this chip being Z80-compatible. We have 48K ROM plus 16K disk basic and 16K system ROM, 256K RAM, two 3.5" disk drives and eight screen modes. Highest resolution is 512x212 using 16 colours and 256x212 using 256 colours.

Makes you think, doesn't it...

All change

Here is a listing for the Mastertronic game *Terminus* which will give you infinite energy

```
0 SCREEN 0
20 COLOR 15,0,0:KEY OFF:CLS
30 LOCATE 10,23:PRINT "LOADING";
40 BLOAD"CAS:"DEFUSR=34200!:U=USR(0)
50 BLOAD"CAS:":U=USR(0)
60 BLOAD"CAS:":DEFUSR=36600!
70 POKE 46865,175
80 U=USR(0)
```

Missing Link

If you tried to log on to *MSX Link*'s new comms number, as printed in a previous issue of *Express*, and found that you couldn't make contact with its board – it's because as the magazine went to press the number was changed. It is now MBX 030035.

Keith Neal

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Airborne Ranger

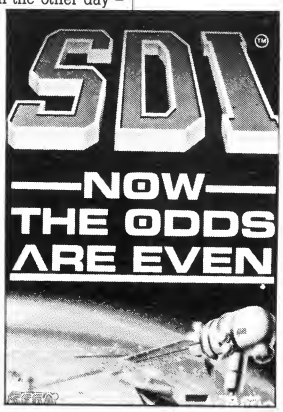
Was chatting to Martin Moth the other day – he's Public Relations Manager at Microprose (I can think of worse software houses to try and do that job for!). It all started when I had a letter from a Mr Simon Barker of Gravesend, who'd noticed two rather odd facts about *Airborne Ranger*. In one mission – don't know if you're familiar with this brilliant "combat simulator," but it's the "Delayed Sabotage" mission – your briefing is to set time bombs to detonate at midnight. But the funny thing is, your bombs go off at the regular 5/10/15 second intervals.

Martin admits that this is an error in the manual (perhaps a feature that wasn't converted for the CPC version?). But it doesn't interfere with the gameplay.

The second of Mr Barker's enquiries may be of some assistance if you're having trouble liberating the POW camp. You may know that the mission is to free the prisoners from a tiger pit by flicking a switch on a control panel after blowing it up. "Well," writes Mr Barker, "I thought as I reached the prisoners, 'a time bomb should do the job.' But no! How stupid of me to assume that, of course the control panel completely disintegrated, thereby ending the mission unsuccessfully!"

When I asked Martin about this, the poor old chap could do nothing but give the game away – and offering solutions is quite against software companies' instincts. "In order to liberate the prisoners from a POW Camp," he says, through gritted teeth and a grim smile, "you need to have done a bit of detective work. If you try and blow up a concrete pill box with a grenade, you'll find it won't work, whereas a time-bomb will. From this you can deduce that the grenade is less powerful. So, by grenading the control panel you will not destroy the switch, thereby enabling you to flick the switch and free the POWs."

Still, he'll be able to get his revenge on Your Correspondent when Microprose 5-a-side team take on The Future Boys. Ready when you are, chaps, ready when you are. (I believe Microprose recently licked Electronic Arts in a paint-gun and camouflage wargame simulation. Electronic Arts? Come on you guys, get serious!)



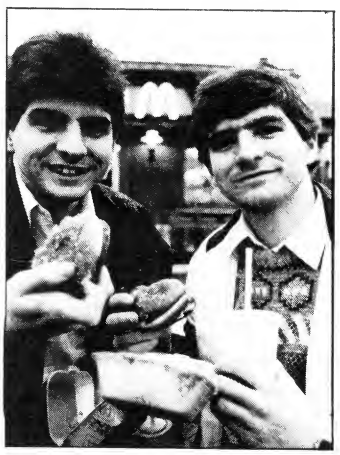
• **SDI: the important thing is to feel a bit silly playing it**

Lazy Savage

If you couldn't be bothered to type in the *Savage* poke I printed here a couple of weeks ago, here's an easier cheat. Paul Davies of Formby has discovered the two passwords to give you three lives on levels two and three: "Sabatto" and "Fergus" respectively.

A banger...

Activision's latest, *SDI*, is here (£9.99 tape, £14.99 disk). Featuring the rather tacky line "Now the odds are even," it's a conversion of the Sega arcade hit, and neatly combines shoot-em-up and strategy.



• **The Olivers research Fast Food.**

Ideologically (my, what big words you have) *SDI* isn't suspect – it's downright guilty. Get this for a scenario: "It's all out nuclear war, and your mission is to defend your country from enemy nuclear space weapons and save the planet from imminent catastrophe." That's right, it's a game that's missed its sell-by date by as much as those commemorative mugs they're still selling in honour of the Pope's visit to these shores. Still, that doesn't stop it being an absolutely brilliant game. The important thing is just to feel a bit silly playing it.

▪ For the full CPC review of *SDI* – and observations from a recently retired special guest – see April's *Amstrad Action*.

... And a Wimpy

Well, McDonald's actually. The Oliver twins' latest *Dizzy* eggstravaganza is here soon. *Fast Food* must be the easiest game ever released for the CPC, though it can be much, much harder if you wish.

Steve Carey

Death of a thousand cuts?

Amstrad's worrying trend continues of cutting back on the CPC catalogue. A while back I told you that the firmware manuals had been let go out of print, with no plans to reprint, and disks have been in desperately short supply for some time. Now the MP1 modulator – the power supply for the 464 – has been quietly dropped.

Dave Ralph of WAVE, the distribution and mail order company, tells me he's had angry letters and phone calls from customers who believe they're being had. "But the truth is," says Dave, "we've been told that Amstrad is 'rationalising its stock,' and won't be producing the MP1 any more." But the MP2 will do the job just as well, won't it, so what's the problem? "Yes it will – except that it costs twice as much, £30 as opposed to £15. You see it's the power supply for the disk drive also: so 464 owners are paying for what they're not using!"

The funniest part in my view is that customers are accusing Dave of taking advantage to "make high profits selling Amstrad parts." This will amuse fellow distributors and retailers, who know just how generous Amstrad dealership terms are...

A4

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Sword of Sodan will not be relegated to the back of the diskbox for a long time to come (if ever!). If you buy one Amiga action game this year, this has got to be it.
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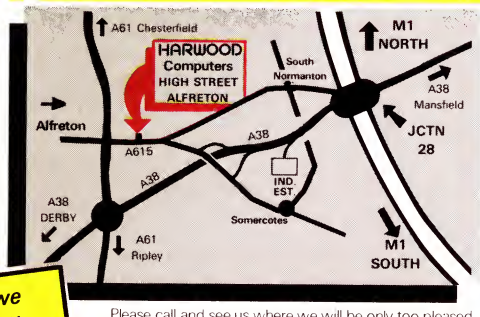

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Image conscious(ness)

Having the latest in graphics software is one thing, but how do you generate your computer images in the first place? Whether you're drawing from scratch or capturing a slice of life, Peter Worlock has the answer...

In order to explore the graphics capabilities of your computer you obviously need some software, preferably a colour monitor – and, on a PC, a graphics adaptor. But to get the most out of your graphics system you might want to invest in some add-on hardware.

Your computer keyboard is adequate for drawing straight lines, whether horizontal, vertical or diagonal, and – provided the software allows for it – can even handle circles and other preset curved objects. But no matter how dexterous you are with your fingers, a keyboard is hopeless for freehand drawing, so you will undoubtedly turn to other tools.

There are other reasons for thinking about hardware expansion: if you have no artistic ability whatsoever you might consider a scanner for importing graphics into your computer, while talented types will cast an envious eye over digitising tablets – the closest thing to pen and ink on a computer.

The following are some of the types of hardware you might consider:

Light pen

Once the supreme graphics device, you rarely see light pens these days.

Light pens work on the principle of the raster scan employed to display a picture on a monitor screen. The pen is basically just a light sensitive diode which registers when the raster beam is directly beneath it. The computer can determine where on screen the light pen is positioned by working out the location of the raster beam when the light pen is triggered.

This allows you to hold the light pen to the screen and draw, just as if you were drawing with ink on paper.

Unfortunately, light pens suffer a number of drawbacks: they are difficult to calibrate accurately; they can't differentiate between fine shades which wasn't a problem on older displays with a maximum of eight colours, but is severely limiting on machines like the Amiga, PC and ST; finally, there is the physical problem that when you use a light pen your arm obscures a lot of the monitor.

Mouse

Since the success of the Macintosh as the graphics system par excellence, mice have proliferated among computers – part of the standard package with Amigas and STs, and an essential extra for many PC owners. Even the older 8-bit computers now boast a choice of add-on mice, usually bundled with good-quality graphics software.

Mice have several advantages: they are cheap; they are very flexible for graphics work; and they are easy to use, combining precise control with the necessary freedom of movement for freehand drawing.

Their disadvantage for graphics is the difficulty of using them for tracing original artwork.

Joystick

Since many users have a joystick for games, it is only natural that some programmers should try to employ a joystick in graphics packages. Unfortunately, most joysticks are digital devices and not much better than the keyboard for graphics.

Digital joysticks only work in the eight preset directions – vertical, horizontal and diagonal – which suffers the same disadvantages as the keyboard in that curves and freehand lines are impossible.

Much better for graphics work are analog joysticks if your computer can handle them – the BBC Micro and the PC (except Amstrad 1512 and 1640s) are the most common users of analog sticks. They allow you to create any kind of line, including the difficult curves.

Digitiser

Also known as graphics tablets, digitisers consist of a hardware tablet – usually A4 or A3 in size – and a stylus or a puck. A puck is more or less a modified mouse incorporating a crosshair for accurate positioning.

The tablet contains a grid of fine wires which register the position of the stylus or puck and transmit the x-y coordinates to the computer which translates them to a screen position.

The appeal of digitisers is that they provide a more familiar way of working for artists – you can use the stylus as a direct substitute for pen or pencil. They also allow to make accurate copies of original images because you can simply place the paper or photograph onto the tablet, then trace them using the stylus.

Their only disadvantage is cost. Starting at around £250, they become extremely expensive if you need greater accuracy for higher screen resolutions.

Scanner

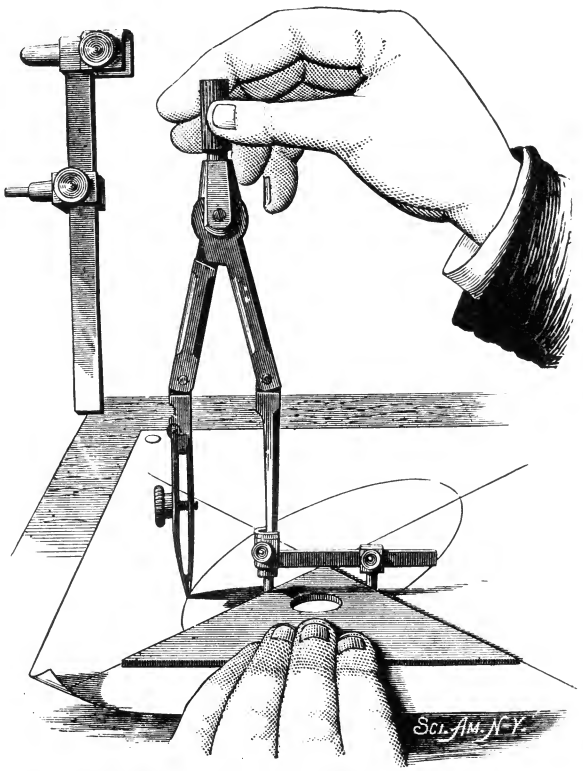
Image scanners have a lot in common with photocopiers – only instead of simply copying an image to paper, they translate it into digital information which can be handled by a computer.

The scanning head holds an array of light-sensitive cells. As the head passes over an image, each cell determines whether its part of the image is "on" or "off", black or white. This bit-mapped data translates nicely into the computer's bit-mapped display.

More sophisticated models use grey-scales and therefore create a more accurate copy of the original – the more shades of grey supported, the more accurate the image. Eight or 16 shades are now common, but the more sophisticated models support 64 or 256 shades. Coupled with resolutions of between 150 and 300 dots per inch, a top-quality scanner can produce images approaching photographic quality.

The original scanners also resembled large photocopiers – they were bulky items with lots of moving parts. Now, scanners come in two kinds. "Flat-bed" scanners still resemble photocopiers but they have slimmed down considerably and are usually no bigger than the average computer printer. Hand-held scanners look like 4" paintbrushes with the bristles cut off.

Apart from the obvious physical differences between the two kinds, there other considerations. The flat-bed scanner will provide higher resolution and more accurate scans (because the scanning head moves at a fixed speed with little or no lateral movement). But they are expensive: prices start at around £800 and you can expect to pay nearer £2,500 for a good one.



• Never use a pair of compasses on a touch-sensitive screen

Hand-held scanners can create good-quality images but only with considerable effort and patience. Image size is also much smaller, usually four inches compared to the A4 size of a flat-bed scanner. However, prices are typically around £300, and hand-held models have the advantage that they can handle items that won't fit comfortably into a flat-bed scanner.

A third, and much rarer, type of scanner fits onto your dot-matrix printer as a replacement for the print-head. The original image is fed through the printer as though it were a normal sheet of paper, but instead of printing an image onto the paper, the printer now picks the image off.

This type can be very cheap – perhaps around £150 – and provides very accurate scans but obviously it can only handle originals that will feed through the printer. Even quite thin cardboard can cause problems.

Video digitisers

The problem of grabbing an image of something that won't fit into any scanner – say a human face – is solved by the video digitiser.

Working like a computer video adaptor in reverse, the digitiser accepts an incoming video signal and converts it to a form the computer can deal with. The machine can then display the image on its own monitor but, significantly, can also manipulate the image in various ways since the digitised image is now no more than an ordinary computer graphic.

In this way you can combine "live" video with the familiar effects of computer graphic packages.

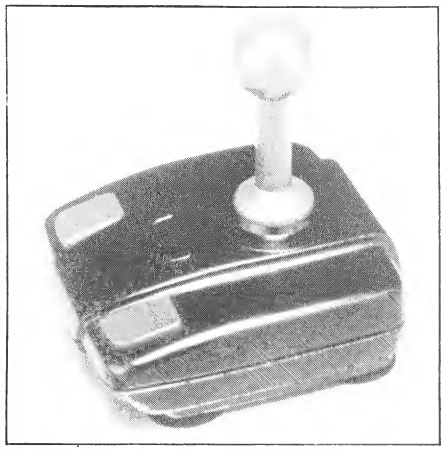
But if you're tempted by a digitiser there are several points to beware. The first is that they can look very cheap compared to scanners – but the quoted prices never include the cost of a video camera, without which you're restricted to grabbing images from your TV or video recorder. It's hard to find a video camcorder for less than £500.

The second point is that a video digitiser is not a genlock. A genlock is a very sophisticated gizmo that allows video signals to be grabbed in realtime, allows external video and computer-generated graphics to be merged, and allows the resulting images to be redirected back to a video recorder.

In other words, a genlock incorporates a digitiser but does far, far more than the digitiser alone.

The right tools for the job

For most personal computer users the first item on your hardware shopping list should be a mouse. You'll probably find far more software support for a mouse than anything else, and they are the cheapest and most effective add-on device for graphics work.



• Joysticks: OK for games, but not much good for graphics unless you have an analogue version – and a computer which can handle it.

Digitising tablets are worth considering if your work includes a lot of technical artwork – architecture, circuit design, engineering drawings and the like.

Scanners, particularly the hand-held variety, represent good value for money but are still expensive unless you're going to get a lot of use out of them. They will appeal especially to amateur desktop publishers since they provide a cheap and fast way of incorporating graphics in your documents.

The video tools are much more specialised, although a video digitiser might also appeal to desktop publishers. A genlock is really only for that limited (but growing) band of would-be Spielbergs for whom an Amiga or ST, camcorder and genlock is the affordable alternative to a Hollywood film crew, sound stage and special effects department. ●

That finishing touch

Touch-screens – items that let you control your computer by physically touching the monitor screen – appear to be back in fashion. There have been one or two advertised for the ST recently.

However, among the first to use the technology more than five years ago was Hewlett-Packard on one of its early PC-compatibles. The machine failed and the touch-screen was written off as a gimmick – with good reason.

For one thing, your screen gets grunged up very quickly as it gets covered with fingerprints, coffee and any other liquid or semi-liquid substance that happens to be around your desk. For another thing, touch-screens suffer the same disadvantage as light pens: your hand and arm constantly obscure most of the display.

Finally, they're hugely inaccurate – how much fine detail can you get, given the size of the average finger?

Touch-screens are OK for specialist uses (like City dealing room terminals), but for most users the verdict must be, "Don't touch".

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TECH TIPS

HELP!
Amiga monitor?

I am considering changing from a Commodore 64 to an Amiga A500. With my present set-up I have a Commodore colour monitor model 1701.

My query is, can this be used directly with the Amiga without the modulator, and if so do you require special leads? Where can these be purchased?

I A McDougall, Pitlochry, Tayside

• The company you want is Trilogic, which specialises in this sort of job. These helpful chaps will supply a lead, or convert your monitor to allow you to get the full benefit of the Amiga's graphics. Give them a ring on 0274 691115.

HELP!
Amiga drive

I have two questions I would like to ask you. First, I'm about to spend my hard-earned cash on an Amiga; would it be possible to use a 5.25" Cumana drive as a second disk drive?

Second, when will the recently-released *Dragon's Lair* be available on the A500?

Stephen Owen, Clwyd

• There shouldn't be any trouble at all in connecting a 5.25" drive to your Amiga since several companies are selling off-the-shelf units for the A500, including Cumana models.

Dragon's Lair is available now. Check out any of *Express*'s Amiga advertisers – you can even get a discount using your *Express Vouchers*.

HELP!
Microdrive microanswer

The Sinclair Microdrive units were first designed and sold for use with the Spectrum. Are the cartridges used with the Spectrum Microdrive compatible and interchangeable with those used on the QL?

RLA Latham, Weeping Cross, Stafford

• Yup! Next question...

HELP!
Speccy printer

As a proud (!) owner of a Spectrum +2, I am writing for your help on two matters. First, could you tell me if I can successfully hook up a Sanple 2000 daisywheel printer and what, if any, extra bits (real technical stuff, eh?) I would need.

Second, is there any way you might be able to print the addresses of any user groups or the like?

SJ Watkins, Stevenage, Herts

• I've never heard of the Sanple, but in principle there's no reason why you shouldn't get it working with your new machine. It depends on whether the printer has a parallel or serial interface. There are several add-on interfaces for the Spectrum allowing it to drive standard printers, and they vary in price between £35 and £70 for the *Rockfort Disciple* which also includes disk interface.

Everyday Spectrum user groups appear to be a bit thin on the ground – the serious users have moved up in the world forming specialist groups for disk-driven Spectrums. But you could try **A Everingham** at **The Bungalow, Keycol Hill, Newington, Kent ME9 8NA**. From there you'll probably get to hear of other groups, then you just follow the yellow brick road.

TIP
Dead-end PC?

Lots of users have trouble transferring data when using disks in 360K and 1.2Mb drives on the PC. Although you can read data on a 360K disk in a 1.2Mb drive, the disk becomes dodgy if it has been written to in a 1.2Mb drive.

If you want to write on a 1.2Mb drive and read on a 360K drive, the only I way have found to guarantee reading every time is to make a disk as follows (Don't format disks this way for normal use because they are unreliable):

1 Use a 48tpi disk. Format it in the 1.2Mb drive.

2 The format will take longer than usual because it will not be able to format all of the disk.

3 Reformat on the 1.2Mb drive using FORMAT /4. This specifies 360K.

4 Use this disk for writing on the 1.2Mb drive, never on the 360K one.

The reason behind the method is that the 1.2Mb drive has heads half as wide as the 360K ones. When you write with the narrow head, it leaves half the 360K format data behind (instead of overwriting it all). My method "cleans" up the bits not written to by the narrower head.

John Sharp, Watford, Herts

HELP!
Canon dip switches

Please can you help a computer ignoramus before I start throwing things out the window. I have just acquired a second-hand Canon A1210 colour printer. Unfortunately, these have been out of production for four or five years and I cannot get a manual for it, but I need the dip switch settings to be able to use this with my Atari.

I have tried Canon, without success.

Arthur Bell, South Shields, Tyne & Wear

• The only advice I can offer is to suggest you open the window before you throw your printer out. This way you save on the cost of replacement glass.

Any Canon printer owners out there able to help?

HELP!
BASIC choice

I am an ST user of limited experience and only know now that *ST BASIC* is about as useful as sunglasses for Van Gogh. So I am now looking for a BASIC language for my poor little machine.

Could you give me any idea as to which one is best for someone who has only used BBC BASIC and BASIC on the old Atari 400?

Nicola Whitehead, Sheffield

• This question crops up so frequently that I'm gradually refining my answer. At one time I used to go into all the ins and outs of the various implementations of BASIC, pointing out their strengths and weaknesses, and providing comprehensive details of pricing, before finally offering the reader my humble recommendation.

But enough already. *Hisoft BASIC* is the one for you (and me and everyone else). £80 for the all-singing, all-dancing version, £50 for the slightly less powerful but still potent *Power BASIC*. Available from any ST dealer worth the name.

HELP!
More cobolers

I own an Amiga 500 having upgraded from a Commodore 64. Can you please tell me if it is possible to program in 6510 machine code on the Amiga using the 64 emulators I have seen advertised?

Also, I am presently doing a business programming course and would like to know if there are any Cobol 85 compilers available for the Amiga and at what price.

Paul Scowcroft, Bolton, Lancs

• The two 64 emulators currently available both support 6510 machine code. However, they each have other problems: they run very slowly, they don't handle sprites particularly well, and sound is a dead loss. To be honest, I don't really see why you're interested.

At the moment there appear to be no commercial implementations of Cobol on the Amiga, although it's possible you might find one in the public domain. Write, with stamped addressed envelope, to the **UK Amiga User Group, 66 London Road, Leicester LE2 0QD**.

HELP!
Does 16 into 32 go?

I have found your magazine lively and informative from issue 1 – well done. Now my problem: I spend a great deal of time producing documents on the ST with *1st Word Plus*. As I teach in the local comprehensive and have access to the full range of Acorn computers and printers I am very interested in finding a means to transfer my files.

I would like to know whether it is possible to format a disk on the ST so that *1st Word Plus* files produced on the ST can be loaded directly into an Archimedes 310 also running *1st Word Plus*. I have heard that someone may have cracked this particular problem.

Are there other possibilities for transferring these files between the two systems other than purchasing an Archimedes?

Mike Miner, Brampton, Cumbria

• I've never used an Archimedes, so I'm guessing, but it seems that file transfer between the ST and Acorn's machine might be quite simple.

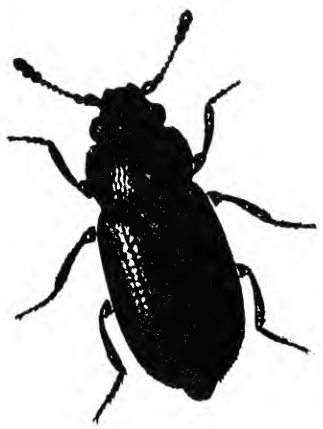
BUG OF THE WEEK

I have found a bug in the Amiga version of *Double Dragon*:

If you press fire on both joysticks when there is only one credit left and no players are on the screen, you will be given infinite credits.

S. Ward, Sutton Coldfield

• We're not to sure about this one – we reckon it might be a cheat mode. Unless, of course, you know better...



Sphindus dubius •
The longish, approximately cylindrical beetles live on slime moulds. They are fairly common at low altitudes in central Europe, where they are found either in gangs of three million at a time or not at all. Apparently harmless, but still vaguely worrying

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Printer drivers

Last week's letters pages contained a plea from the heart from John Smart, of Hitchin, Herts, who asked: "Can *New Computer Express* succeed where all other magazines so lamentably fail?"

The cause of his anguish is printer drivers. Could we, he begged, give him "a blow-by-blow account of exactly how these mythological beasts are written?"

Well, sadly John, the answer is we can't. But I'll gladly tell you why we can't.

If you followed the *Learning Curve* series on printers you'll remember that all printer features are controlled by a sequence of codes. A printer driver is more or less a translation table that allows the computer and applications software to select the right codes for effects like bold, italic, and underline, and more advanced features like different typefaces and sizes.

So far, so simple. Unfortunately, the way in which the printer is controlled varies from com-puter to computer. For example, the Amiga provides a central form of control under AmigaDOS so that all Amiga software uses one driver held by the operating system. Most other computers fail to provide such a simple system, and printer control is left to individual software packages.

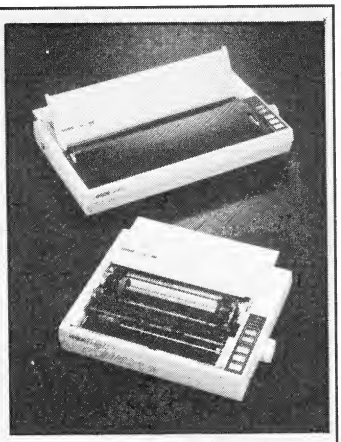
Furthermore (and you probably guessed this was coming) different software implements printer control in different ways. Some packages have printer control built-in to the program code, so you can't add support for new printers without re-writing the program. Other packages use a separate printer driver, like the Amiga's but each program uses a slightly different form of driver so the driver for one application won't necessarily work with another piece of software.

Some thoughtful programmers – I've seen several examples on the Atari ST – recognise the problem and build into their programs interactive routines that let you construct a driver by entering the appropriate codes for your printer. Sadly, this kind of consideration for the humble punter – who, after all, only spends the money – is rare.

However, the whole question of printer drivers really only arises when you're talking about graphics. If your 24-pin printer comes with built-in fonts, any text-based software can use these fonts – and that means most word processors, databases, spreadsheets, and so on.

Graphics programs cover the obvious design packages, and also desktop publishing programs and certain word processors that treat all text as graphics. This is why printer drivers are a particular problem with the Amiga because the Amiga treats *everything* as graphics.

But the good news for John, and many other users, is that printer drivers aren't really an issue, because John says his main software is *Protext* and *Masterfile 8000* running on an Amstrad PCW8512. Those are text-based packages, so John can safely upgrade to a 24-pin printer secure in the knowledge that his output will appear in glorious letter-quality type.



• Printer drivers: the final word?

The ST uses the same disk format as the IBM PC – I don't know whether the Archimedes uses the same (miracles can happen) but it might be worth sticking an ST disk in the Archie to see what you get.

In any event, using the PC emulator on the Archimedes solves the problem, provided you can read the data from the ST/PC disk and re-save it to an Archimedes format disk. And if any reader knows of a specific solution to the problem, we'd like to hear about it.

HELP!

CLImbing up the wall

I have an Amiga 500 (no external drive) and recently invested in some PD software. Some of the disks and files run from icons with *Workbench*, but some need to be run from the CLI.

After reading a letter in issue 13, I bought *The AmigaDOS Manual* from Bantam. Unfortunately, it does not tell me how to run programs using the CLI. I have read it from cover to cover, twice, and have learned a lot but not what I need to know.

I assume I am reading the wrong book, or misunderstanding what I am reading. I hope you will show me the syntax required and an example command.

William J Fox, Matlock, Derbyshire

• In theory, running a program from the CLI is simplicity itself; the complications arise from the need to name Amiga disks.

All of the AmigaDOS commands are programs, so when you enter DIR, or TYPE or COPY, you're executing those programs. In other words, you already know how to solve your problem.

Suppose the program you want to run is called MYPROG. All you do at the CLI prompt is type:

MYPROG <enter>

and the Amiga will find the file MYPROG and execute it.

The catch: the Amiga only looks on the disk that's in the drive, and if it doesn't find MYPROG it protests.

So, suppose MYPROG is on the disk called PDSTUFF. Enter:

PDSTUFF:MYPROG

Further, let us suppose it's within a directory called GAMES. At the CLI you enter:

PDSTUFF:GAMES/MYPROG

Now that AmigaDOS knows which disk MYPROG is on, if PDSTUFF isn't already in the drive, AmigaDOS will politely ask you to insert it. The sun shines, and all is right with the world.

AMIGA

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● Two classic titles hit the Spectrum and Amiga this week – *Xenon* and *Space Harrier*. Thankfully, they're both up to scratch and worthy of their predecessors – which is more than can be said about the tiresome *Titan* and the awful *DNA Warrior*.

However, the game that blasted away all the competition was the brilliant *Battlehawks* ...

XENON

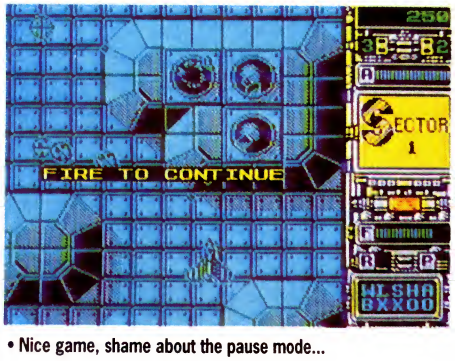
MELBOURNE HOUSE

Spectrum • £9.99cs, 14.99dk
Already on ST, Amiga
Out soon on C64
CPC version under consideration

***Xenon* – the popular ST and Amiga vertically-scrolling shoot-em-up and star of the Saturday morning TV show *Get Fresh* – has finally arrived on the Spectrum, a micro not exactly renowned for its coin-op audio-visuals...**

● GAMEPLAY

No complex thought processes are needed in this game of course, just plain old lightning reflexes as you guide your craft through four sectors of highly defended alien territory.



• Nice game, shame about the pause mode...

During play you can flick between a durable ground craft and a fast jet fighter, depending on the type of opposition and obstacles you meet along the way. These include aircraft, ground vehicles, gun emplacements, and the obligatory well 'ard end-of-section guardian. Luckily, you'll also be able to collect pods left by the debris of wrecked alien fodder to give you add-on weaponry such as lasers, homing missiles and wing-tip blasters.

● GRAPHICS AND SOUND

Audio-visuals are unbelievably good throughout – everything from 16-bit *Xenon* has been near perfectly captured, ranging from sprites and backdrops to the soundtrack and sound-effects. Although the visuals are monochrome, they're well designed, smoothly animated and completely convincing. The only glitch to be seen is the slowness of action when the large end-of-section guardian appears.

● OTHER VERSIONS

Xenon is well worth a look if you're an Amiga or ST owner. It really uplifted the state of 16-bit releases, and helped launch a promising career for the Bitmap Brothers, the programming team that produced it.

● EXPRESS VERDICT

When *Xenon* was released on 16-bit format, it really stood out from the crowd, because there hadn't been a vertical shoot-em-up that good before. Unfortunately, the Spectrum is an old master of the genre, and already has a myriad of great examples available for it, such as the classic *Light Force*.

Having said that, Spectrum *Xenon* is a great conversion containing a remarkable representation of the 16-bit versions audio-visuals. It provides an exciting game of shoot-em-up warfare, albeit at a rather expensive price.

✪ ✪ ✪

Rik Haynes

SPACE HARRIER

ELITE

Amiga • £19.99dk
Already on Spectrum, C64, CPC, ST
Sega console (Sega/Mastertronic)

The Sega coin-op that launched a thousand hydraulic chairs – *Space Harrier* – has finally landed on the Amiga, so has it been worth the three-year-long wait?

CLASSY CONVERSION

● GAMEPLAY

You take on the role of a hero equipped with jet-pack and blaster, in a head-on shoot-em-up against a multitude of alien spacecraft. These include such weird creatures and objects as dragons, robots, giant toadstools and mean 'n' massive mammoths, to name but a few. Only the Japanese could interweave such obscure elements into a computer game – and successfully pull it off.

● GRAPHICS AND SOUND

Amiga *Space Harrier* is fast, full-screen, colourful, well designed and very impressive. Everything is well up to scratch. Sprites, backdrops, soundtracks and sound-effects are all very reminiscent of the classic coin-op, and are only marred by the laughable attempt at the "Get Ready" sampled speech message.

● OTHER VERSIONS

Released back in Christmas '85 for Spectrum, C64 and CPC, *Space Harrier* soon achieved the Xmas number one position in the software charts and still remains one of those playable and ever-popular 8-bit computer games. But perhaps the best 8-bit version is by Sega itself for its 8-bit console. And this trend looks like it may continue onto 16-bit formats when the Sega 16-bit console reaches our shores later this year, because *Space Harrier II* on this little baby is amazing (check out *Express* issue 4 for more details).

● EXPRESS VERDICT

Space Harrier has been well crafted in its conversion to the Amiga, with superb audio-visuals and fast, uncompromising but highly entertaining gameplay. While that gameplay may be rather unoriginal, *Space Harrier* still manages to provide an enjoyable foray into that twilight zone known only as total addictiveness.

✪ ✪ ✪ ✪

Rik Haynes

• Our hero blasting his way through Level One

TITAN

TITUS

Amiga • £24.99dk
Out soon on C64, CPC, ST, PC
Spectrum version under development

Titus, the French software company famous for its *Crazy Cars*-type games, has produced something different in *Titan*, an eight-way scrolling combination of a breakout and puzzle game.

● GAMEPLAY

Controlling a cursor, you have to make you way through 80 different levels (mazes) by knocking out all the blocks in each one.

This is achieved by directing a constantly moving sphere against the blocks. You guide the sphere by hitting it with your cursor at just the right angle, thus making the sphere spin off in a different direction.

● GRAPHICS AND SOUND

The sphere sprite and backdrops are very effective, and the full screen is used for the display. Unfortunately, this is negated by the jerkiness of the eight-way backdrop scroll, which gives your eyes a severe bashing.

Audio comprises possibly the worst soundtrack we've heard in a game – it's just a sampled collection of bangs and crashes which constantly repeats after only a few seconds. The soundtrack is even more irritating and repetitive than a Jean Michel Jarre record.

● OTHER VERSIONS

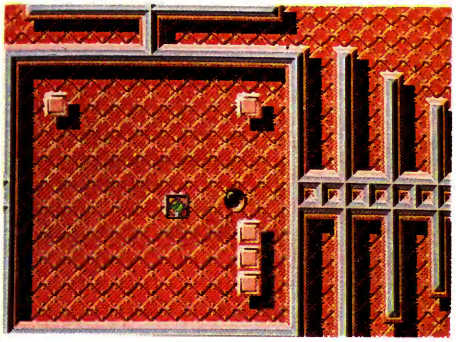
Sorry, no details on the other versions yet.

● EXPRESS VERDICT

Titan is the micro equivalent of acid house – it's colourful, loud and bound to give you a migraine.

✪ ✪

Rik Haynes



• Pass me those headache pills...

DNA WARRIOR

ARTRONIC/CASCADE

C64 • £9.99cs, £14.99dk
Also on Spectrum
Out soon on Amiga

***DNA Warrior* is a horizontally-scrolling shoot-em-up, with you in control of a microsubmersible injected into the bloodstream of a duo-brained scientist. You're assigned to destroy his/her second brain before it's too late...**

● GAMEPLAY

No surprises to be found here, as you're bombarded by all the cliches of the genre – basic bog-standard alien attack formations, hazards and extra weapon collectible pods, all presented in a uninteresting and amateurish fashion.

● GRAPHICS AND SOUND

The only interesting audio-visual element is the end-of-game jingle which sounds like it's out of a Bruce Forsyth game show. Yep, it's that bad.

● OTHER VERSIONS

If you thought C64 *DNA Warrior* was dross, wait till you see the Spectrum version. It's so slow it seems comatose at times, contains one sound-effect and is earthquake-sim jerky...

● EXPRESS VERDICT

If you thought that *DNA Warrior*'s scenario was totally unoriginal rubbish, wait till you *play* the game. It's not only completely unoriginal, unplayable and boring, but also badly implemented. Sure the C64 *DNA Warrior* fares better than the Spectrum, but then you've got all those hardware facilities for graphics and sound.

Why bother with the pitiful *DNA Warrior* when you could go for the brilliant *Delta*, *Armalyte* or *Denaris*? We asked ourselves the same question.

✪

Rik Haynes

• Shoot those alka-seltzer tablets

BATTLEHAWKS

LUCASFILM/US GOLD

PC • £24.99dk
Out soon on ST, Amiga

Not to be confused with the terrible Gerry Atric puppet TV show, *Battlehawks* is a historical flight-sim based on naval air combat in the war for the Pacific back in 1942.

● GAMEPLAY

Battlehawks allows you to train or fight in four of the major battles in the Pacific War and contains a wide variety of choices ranging from plane selection to taking on the role of either a Jap or a Yank pilot. This is represented by well drawn menu screens which really add to the atmosphere.

HISTORIC REALISM

Whether you go on a training mission or active duty mission, you'll have the choice to fly fighter escort, fighter defence, dive-bombing or torpedo bombing missions. In fact the only type of mission missing is the George Bush sea-rescue mission.

Starting the mission presents you with a familiar cockpit display, your plane in mid-air, and everything ready to rock 'n' roll. All in-flight control is at hand, including movement and weapon controls, a camera with record/playback options, and a viewpoint selector. Once your mission is complete, you get a run-down (de-briefing) of the events from your CO.

Battlehawks comes with a comprehensive manual setting out the gameplay and historic background, and generally puts you in the mood for the ensuing action.

● GRAPHICS AND SOUND

CGA visuals are rather disappointing, but *Battlehawks* really takes to the skies when played in EGA mode, with colourful, attractive selection screens and an accomplished in-flight display, slightly marred by a lack of speed and noticeable jerkiness.

Audio confines itself to the normal selection of spot-effects.

● OTHER VERSIONS

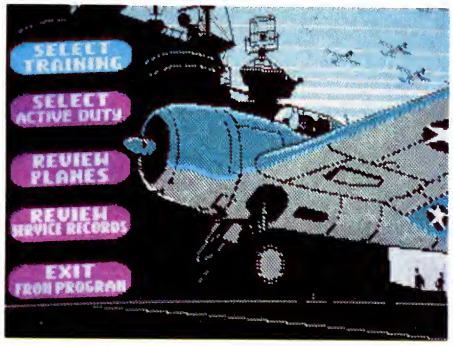
Battlehawks is nearing completion on the ST and Amiga and will hopefully turn into versions containing the same high standard of gameplay as PC *Battlehawks*, but with superior audio-visuals.

● EXPRESS VERDICT

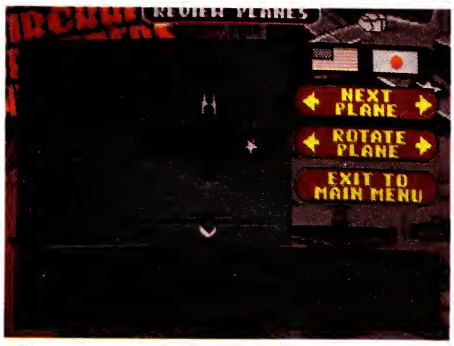
Battlehawks is another flight-sim in the *Interceptor* mould – easy to play, enjoyable and totally addictive – which may not be as authentic as *Falcon* or *F-19*, but is undoubtedly great fun to play. With its selection of different missions and skill levels, *Battlehawks* should provide an enjoyable challenge – and promises a substantial degree of lasting interest.

✪ ✪ ✪ ✪

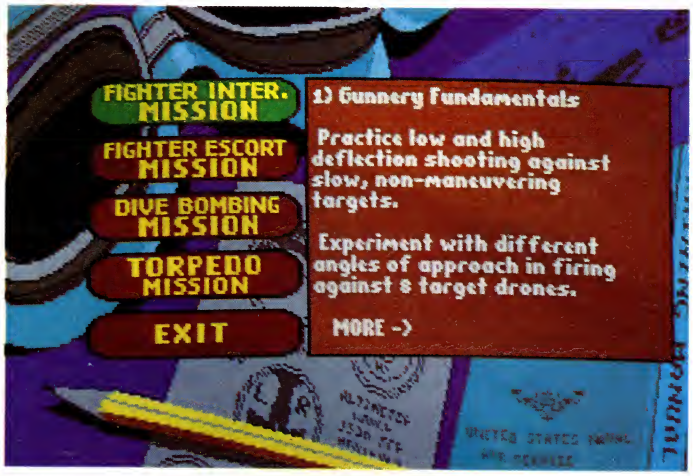
Rik Haynes



• CGA: Start-up screen



• EGA: Get your tech specs here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UNITED STATES NAVAL

• EGA: The training mission selection screen

• EGA: Your flight review

A can of worms

Rik Haynes goes round the mulberry leaf to check out the worm that turned...

SILKWORM SALES CURVE/REBEL

These screen shots are from the Amiga version of *Silkworm*, a horizontally-scrolling shoot-em-up coin-op conversion featuring simultaneous two-player action.

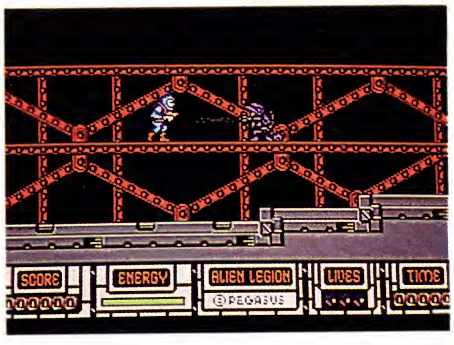
Taking control of a helicopter and a jeep, you'll travel through picturesque landscapes battling against a myriad of enemy aircraft, ground vehicles and ground emplacements. Out soon on C64, ST and Amiga.

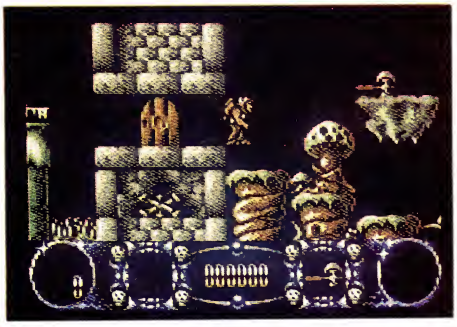
RAIDER IMPRESSIONS

Another debut release is *Raider*, a game in a similar vein to *Thrust* and *Oids*. The scenario sees you flying a spacecraft through a series of eight planets, taking out all turrets on their surfaces, in the hope of saving the Star System from the Border Raiders. Out later this month on Amiga.

ALIEN LEGION GAINSTAR

Completing the hat-trick of debuts this week is *Alien Legion*, a platform exploration game from Gainstar. This is a company perhaps better known for its US software title importing. *Alien Legion* is being developed by Gainstar itself, and should be available soon on ST and Amiga.



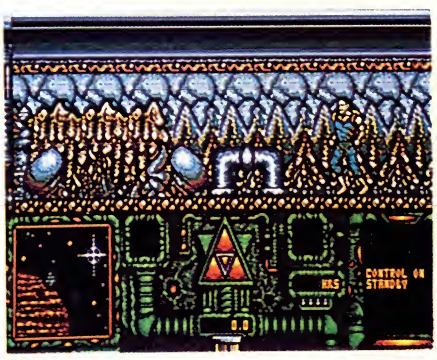


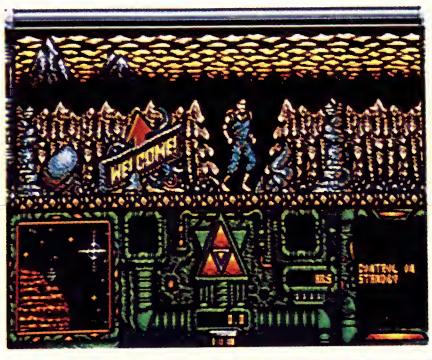
STORMLORD HEWSON

This is a screen-shot of *Stormlord* on the C64, due out sometime this month. As Stormlord, your mission is to save the imprisoned fairy folk from the evil Queen and live happily ever after. Let's hope the action's a lot tougher!

PRISON KRYSALIS

Krysalis's debut release, *Prison*, should appeal to exploration fans when it shortly hits the streets on ST and Amiga. As a disgruntled exile in a futuristic space colony, this arcade adventure will see you searching for loadsa locations to piece together a spacecraft to jump off-world.





AIRBORNE RANGER MICROPROSE

Airborne Ranger – already out on Spectrum, C64, CPC and PC – should be available shortly on the ST. A cross between the classic coin-op *Commando*, and a strategy game, you're placed in a 12-mission simulation of a lone Airborne Ranger parachuted into enemy territory and looking to kick some butt

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PSsst!

The page that takes the *PSsst!* out of computing hype...

The Voice of the People

Will the Atari Pocket PC be the Sony Walkman of computing? Will we see every image-conscious lawyer, doctor, estate agent, writer, journalist and other professional using one on the train home each evening? Will it make it to the masses?

PSsst! asked several punters at the Atari stand what they thought of it.

Piers Ffoulkes-Ccarrington (rich person in suit)

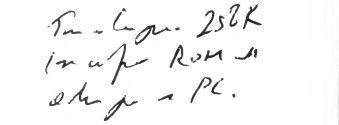
Um, yah, it's really good, I mean I would use computers a lot but I travel around on business you see. I have to take things with me. It'll go nicely with my Filofax and my Sony recording walkman, um, and then my pocket TV, and of course my carphone and Vodaphone, and my travel iron, oh yah and my pocket shaver, plus my pager, er... then there's my battery recharger... er... what's this Folio thing do exactly?

Nigel Hobbs (of Hobbs, Cure and R. Cane, Solicitors):

• Atari's pocket PC (arrowed)

Notwithstanding the Atari Pocket PC (hereinafter referred to as 'the computer') inasmuch as heretofor and hereinunder it shall be deemed a 'portable computer' (whereas under and excepting the provisions of the term 'computer' as defined hereto) and, insofar as it would, under the terms of the provisions indicated, be not deigned hereby *(cont'd p365)*

Dr Ileh Jabul MD



Derek Blurb (Estate Agent)

This charming computer, conveniently sized and possessing all amenities, offers the first-time buyer an excellent opportunity to move into the portable market. Its 128K RAM is deceptively spacious and the eight-line screen affords intimate views of the data. It is conveniently situated for ROM and has easy access to the local spreadsheet and word processor. Planning permission for extensions to incorporate modem and memory cards has been granted.

Simeon Twaddle (Art Critic)

Personally I found the work disappointing. Atari's earlier concern with themes such as the dichotomy between emotion and logic at the man/machine interface, as evinced so clearly in such works as *Monitor SM1224 for the ST* and *800XL with disk drive and Ten Bundled Games*, has been swept aside as its preoccupation with the reductiveness of computing is taken to its logical conclusion. Spurning any attempt at minimalism or tautness of expression, the new Folio attempts to encapsulate the wholeness and universality of the computing genre in one compact work. The Herculean endeavours to bestow a Renaissance-like fundamentality of 'complete knowledge' merely engender *(cont'd p365)*

Nick Ferret (Sunday Sport journalist)

HITLER SPOTTED ALIVE ON MOON USING POCKET PC TO PLAY NAZI GAMES

Shane Burke (16) (Computer Games writer)

Well the Pocket PC is no good I mean it dosent play games becasue the screen is to small, and how would you get some-thing like Emanuelle 2 or Teenage Queen or Strip Poker, or even Arkanoids or Elite or Virus, i think its a waist of money, my AMIGA is much better, I have Populuos and Interceptor and Flying Shark and Elite and Teenage Queen and *(cont'd p 365)*

Mrs Brady (Old lady)

What's a folio when it's at home then? I think it's a liberty, whatever next? Machines are taking over. It's marvellous. 256K RAM indeed. We're all just numbers now. They make too much of a racket. All this loud music. You'll be my age one day. Young people waste their money. I'll Pocket PC you in a minute. Long-haired layabouts. What will they think of next? You can hardly even see the keyboard. Bread and jam was good enough for us. Can't tell them apart nowadays. Different now of course. And it costs £200! Lot of money in them days.

A. Selman (Virus-buster)

It's riddled with viruses already. When you close the lid, all the display is wiped clean, and only reappears when you open the lid again! And the smart cards are an ideal breeding ground for worms. The fact that it doesn't use discs makes it much more liable to spread viruses, because users are lulled into a false sense of security. No-one should use one unless in the presence of an expert, like me.

Shoot from the Lip... *the week's most quotable sayings*

"Quite frankly the ads were a bit of a disaster and it's pretty safe to say that we won't be doing them again."
Elite's Brian Wilcox to trade paper *CTW* on the short lived penchant for advertising games on the baffling medium of radio.

"Orchestrator is MPE compatible – you can play your KCS sequencer while you edit, and record SYSTEX data directly into KCS."
One for the jargon freaks from music specialist – wait for it – MCMXCIX.

"Konix brought out its ergonomical joystick and swept the market. We intend to do the same with the mouse."
Logitech's Nick Pearson on his new funny shaped tracker.

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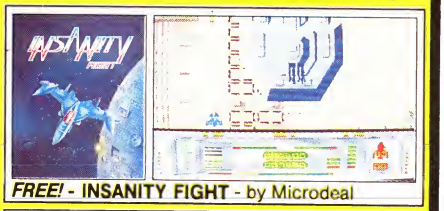

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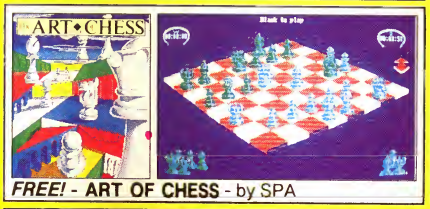

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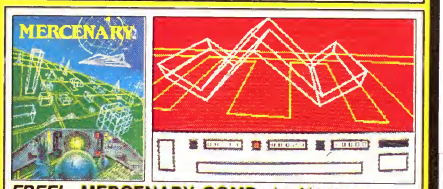

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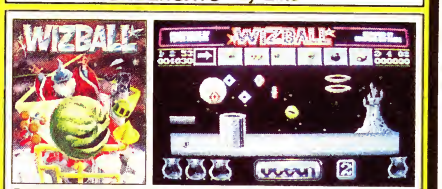

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